

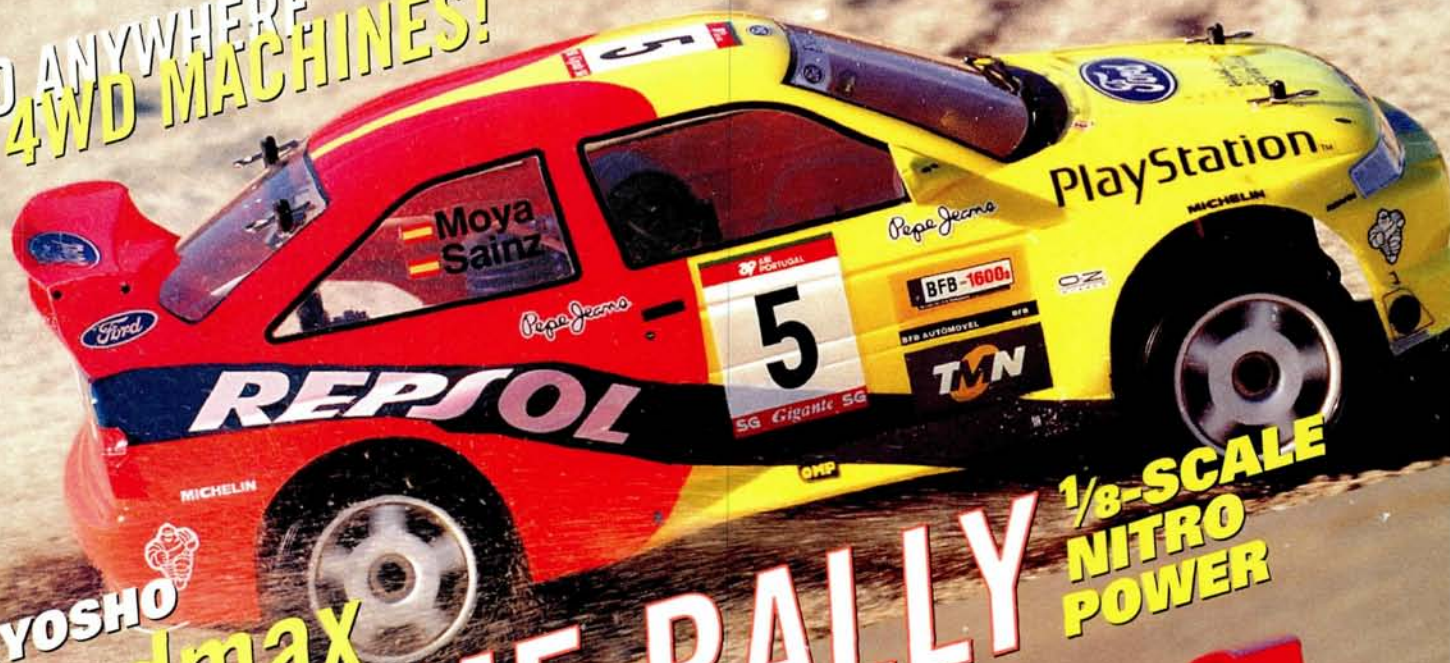


Radio Control CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

April 1998

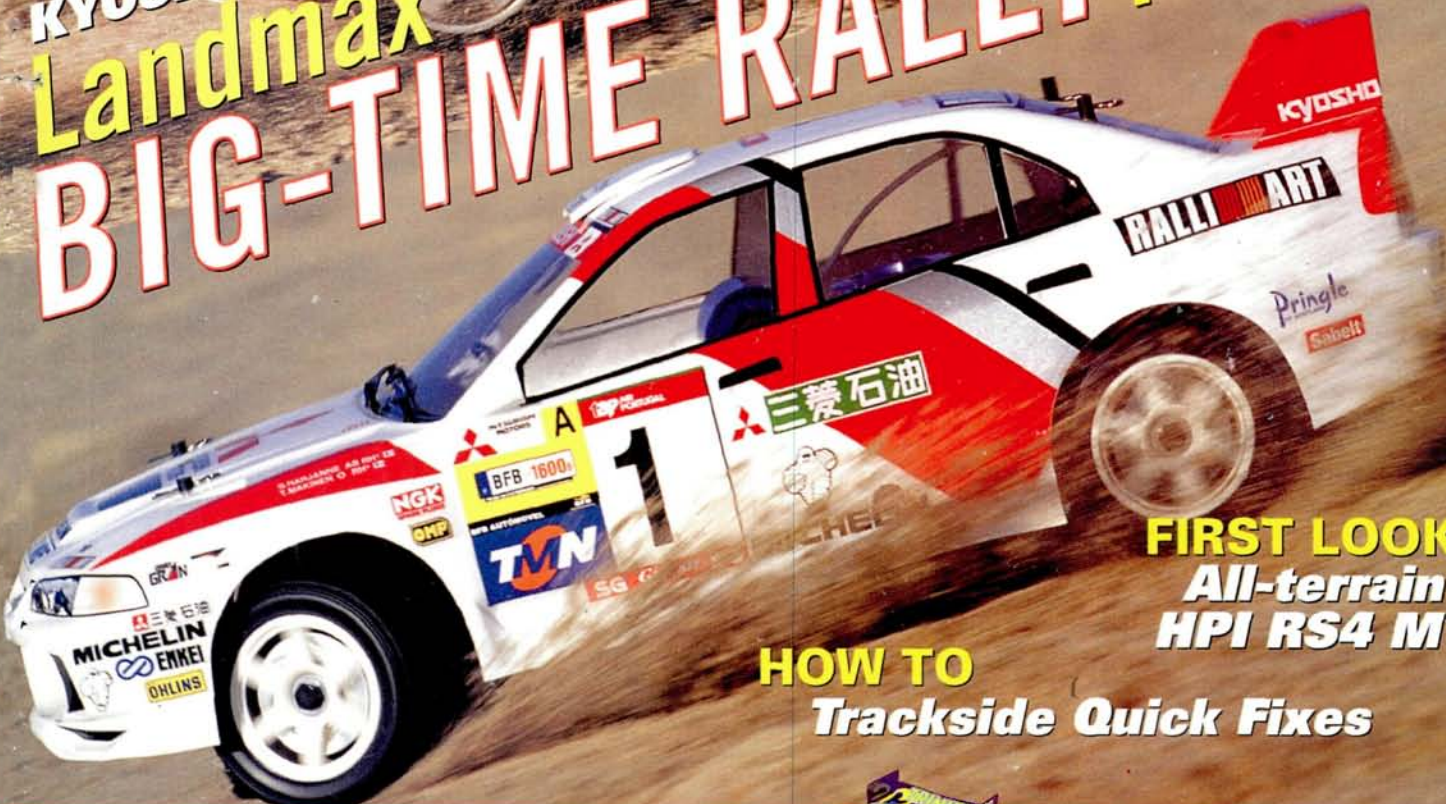
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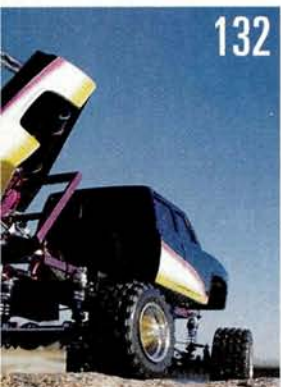


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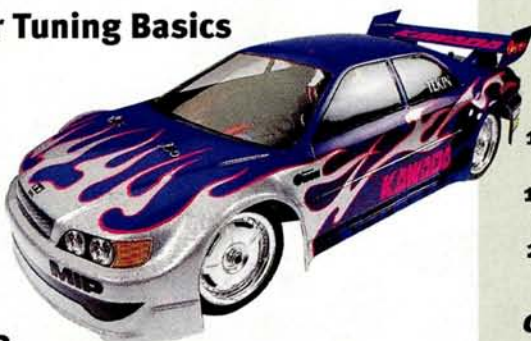
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ON THE COVER (from top): OFNA's hot new Z10 Pro gets ready to tear across our logo; Kyosho's Repsol Ford and Mitsubishi Lancer Landmax vehicles get down 'n' dirty; Team Losi's Kinwald Edition XX 'CR' is poised for battle. (All photos by Walter Sidas.)

This one's for you!

Are you the kind of rally-racing fan who will stay up till 2 a.m. to watch a race—even though it's broadcast in Portuguese? If that's you, you'll



love the new **Kyosho Landmax** 1/8-scale rally cars; they're big, fast and powerful, and we have the exclusive test on these nitro machines. Speaking of nitro engines, this month marks the debut of



"Piston Power"—Chris Chianelli's new engine column (this month, his topic is staying cool—of course!). If you're one of the many to email us looking for

info on "that HPI truck," this is your issue. Our **HPI RS4MT**

"First Look" is in your hands! We also have

some exciting "Thrash Tests," including a look at the

OFNA Z10, complete with Tim Bump's Nats-



winning setup. A must-read is our test of Team Losi's **XX 'CR'**



Kinwald Edition buggy. Don't you want to

know how the champ's car works? If you'd like to make

this the year you start racing, don't miss our **"Spec**

Racing Guide." If you want to start out fast and fair, spec is

the way to go. And that reminds me, I have to go!

Enjoy the issue.

George M. Gonzalez
Senior West Coast Editor

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This competition chassis is available without engine (w/o tune pipe). For the aspiring 1/8 racers, the Mirage VSPEC is also available with our racing PRO-21B-R(P) engine (or the pull-start PRO-21BX-R(P)) and IFMAR spec. tune pipe.



MIRAGE VSPEC

1/8 Scale Nitro-Powered 4WD Buggy

More Rally Cars Please

Great magazine! I always count the days until my next monthly dose. I noticed a rally car on the upper right corner of the January issue's cover. My heart skipped a beat when I saw the picture of this stunning vehicle. I'm into racing 2WD off-road buggies, but would like to become involved in rally-car racing. Does such a racing class exist? If it does, I would like to know about it.

I appreciate the fact that *R/C Car Action* is such a diversified

publication, so you can look forward to reading more about them in the near future. In the meantime, be sure not to miss our "Thrash Test" on the Kyosho Landmax GP; I think your heart might skip a few more beats!

—G-Man

Dual-Personality Vehicle

I have been reading your magazine for several years and enjoy it very much. I have a Traxxas Rustler with a Protoform Rambunctious ET body. I race the

truck often, but the buggy class has caught my attention due to its growth at my local track. I want to try racing in the buggy class, but don't have the money to buy a buggy. Can I convert my Rustler inexpensively? CLAY WEHRER
Petaluma, CA



publication. You guys cover off-road, on-road, 4WD, touring cars, F1, ah The list is too long to continue. But I've yet to hear about these mysterious rally cars. I think rally-car racing could be a major contender in the wide world of R/C racing. What do you think? [email]
JARED CHUNG

Jared, thanks for the kind words. The rally car you write about is Kyosho's new 1/8-scale Landmax GP (in Repsol Ford Escort racing trim), which was featured in "New for '98" in January. You'll find an expanded "Thrash Test" of this hot new vehicle in this issue. To my knowledge, there is no organized racing class for these types of vehicles, and that's a shame. I agree that rally-car racing, if organized well, could become a major class. Kyosho and Tamiya produce many fine rally-car models that perform very well on- and off-road. In the August '96 issue, we published an article about converting 2WD buggies into rally cars, and it was very well received by our readers. We are currently working on a sequel to this arti-

cle, Clay, this is one of the cases where it is easy to transform one vehicle into another at low cost. Many Traxxas vehicles have the same chassis and suspension components, and this is especially true of the Rustler and the Bandit. Since the Rustler has the same chassis as the Bandit, the only parts you'll need to buy for your conversion are the Bandit's body, wing, buggy wheels and appropriate tires (see what the fast guys at your track suggest). Good luck racing in the buggy class.

—Greg

Big-Engine Blues

I receive your magazine every month, and it's always well worth the wait. I own a Kyosho Sandmaster MKII and want to hop it up. Could you recommend a few parts? I also want to install a bigger engine than the stock .11 size. Could I fit an O.S. CZ-Z non-recoil engine in the buggy?

CHRIS CUPP
Kansas City, MO

Ahhhh! Young grasshopper, you must pace yourself! Kyosho does

offer aftermarket items such as ball bearings, better shocks, universals and a ball differential. I recommend that you purchase these parts in the order given. Try out the car after making each modification; there should be a noticeable difference in performance and handling.

If you still crave more speed, you can bolt in a larger engine (up to a .15). Now here's the "but": only engines with recoil starters will work. Because the flywheel does not exit the bottom of the chassis, there is no way to bump-start a non-recoil engine. Also, if and when you do buy a new engine, you'll need Kyosho's engine mounts and flywheel to complete the installation. Since the strain on the drive train will be increased by the hotter engine, adding the optional slipper clutch is also a good idea.

—Greg

Looking to add some Gleam to your Machine?

I'm in search of a company that does chrome plating for R/C parts by mail order. Do any companies provide this service? By the way, I've been a subscriber for over four years and look forward to every issue. Keep up the good work! [email]
TONY

I race my Team Losi Double-X 'CR' every weekend. I've seen pictures of Brian Kinwald's car many times

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

INTERNET ADDRESSES:

Chris Chianelli: chrisc@airage.com
George Gonzalez: georgeg@airage.com
Peter Vieira: peterv@airage.com
Greg Vogel: greg@airage.com

in your magazine and wonder who does all his custom blue anodizing. My car is completely decked out in graphite, and I've also added Team Losi's optional king-pin balls, lightweight top gear/shaft and lightweight motor mount. I would like to have the motor mount and the shocks anodized in blue and would like to install blue aluminum screws and nuts. Where can I get all these items? [email]
JEFF THOMPSON

Tony and Jeff, 12-Pak Racing & Custom Anodizing does custom anodizing and polishing by mail order; call (209) 433-1997. The folks at 12-Pak do not offer a chrome-plating service, but they can polish aluminum parts to a high luster. You could also turn to your local telephone directory and search under "Chrome-plating." 12-Pak can anodize your aluminum parts—no problem. A blue-anodized aluminum screw set for your car is available from Trinity—(732) 635-1600—and you can get the nuts from Factory Works—(909) 735-5516. Good luck.
—G-Man

Errata

In the February issue's "Racing ESC Guide," the Novak portion of the comparison chart contained errors. Here are the correct specs:

	Cyclone	Tempest Max	Racer EX
Resistance (ohm)	0.00067	0.00067	Unchanged
Weight w/o wires (grams)	40.82*	60.1*	59.5*
Forward current	480	480	Unchanged
Brake current	160	160	Unchanged
Temp. protected	No	No	No

*Novak pointed out that they include a generous amount of extra wire with their ESCs, which shows up as extra weight in our chart. The weight shown above for the Cyclone does not include wires. The Tempest Max and Racer weights reflect an amount of wire comparable to other ESCs in the guide.

It should also be noted that Novak's Duster, Duster II and Explorer speed controls were not included in the guide. However, these forward-only speed controls can be used for racing. For additional information on these and any of Novak's other products, check out Novak's website at www.teamnovak.com.



Nitro Quad

Kyosho is, without a doubt, an innovative company (seems I've said that elsewhere in this issue). On the left is their new ATV Quad Rider with GT12S-CR pull-start engine. This 16.9-inch model (that makes it 1/8 scale ... I think) features: partially built fiber-resin chassis with installed engine; suspension arms; gearbox and tank; three, long-stroke, oil-filled shocks; ball differential; 75cc flip-top tank; air cleaner; mini-pin rear and ribbed front off-road tires; chain drive; monoshock swing-arm rear suspension; double-wish-bone front suspension; polycarbonate (Lexan) body and soft vinyl resin driver figure. This much is certain: we're gonna have some fun with this one.

Chris is
so-o-o-o
dreamy...



Kyosho also produces celebrity figurines for the Japanese market.

Full-Blown Formula 10

As the photos show, like the Pure Ten Series, Kyosho's new Formula-10 Series can be highly modified with an extensive line of performance components. I got a close look at this car recently while in Japan, and though it does sacrifice scale appearance ever so slightly to accommodate its 4WD system, the overwhelming benefit is a machine that will deliver race excitement because of solid handling, even on less than perfect road surfaces.



Now, in my opinion, this is how an R/C road machine should be designed—low-slung like a predatory

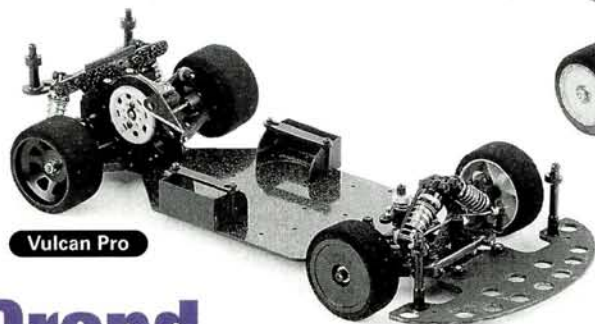
cat ready to strike. What you're looking at is the revolutionary O.S. .12 LD (laydown) engine mounted in a Kyosho Super 10. I'm told this engine will fit in the Super 10 with no modification whatsoever. The pull-start version does require clearance shims, but they're included with the engine. I'll have more info on this combination and on the engine itself in an upcoming "Piston Power" column.

Low-Profile Street Machine

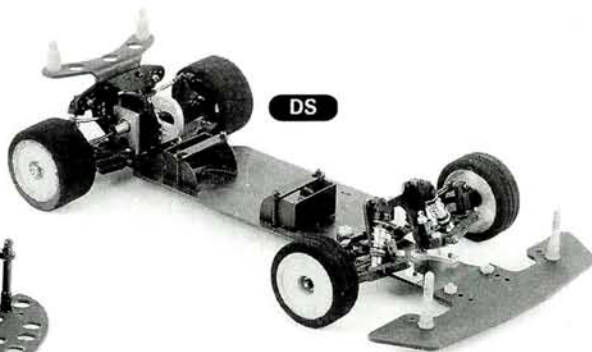
NEW LIMITED-EDITION MODIFIED DYNAMITE .12PD

Horizon Hobby has just released a hopped-up version of its popular Dynamite .12PD engine. As you know, "PD" stand for "Paris dish"—the innovative, dished piston design created by the man himself, Ron Paris. The new mill has a lot more Ron-action than just the namesake piston design, however; other Paris-approved mods include: a new 7075 (translation: super-hard aluminum) connecting rod; modified intake ports for increased power and efficiency; knife-edged crankshaft counterweight and additional flow port; hard-anodized crankshaft; hard anodized backplate (to reduce friction against the con-rod); and increased compression (thanks to a modified combustion chamber). But the really cool thing about this engine is the exclusivity factor: only 100 will be built, and each will display Ron Paris's engraved signature and its own sequence number (ours is number 17). Contact Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 352-1958; fax (217) 352-0355.

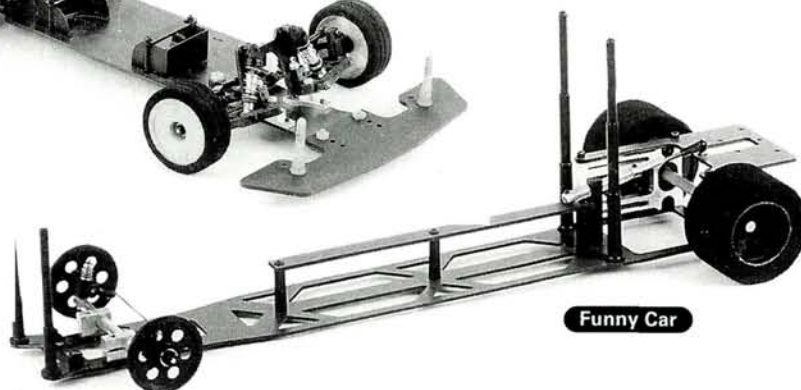




Vulcan Pro



DS



Funny Car

Grand Motorsports

Grand Motorsports has some exciting conversion kits for Associated vehicles and a couple of new drag machines for you straight-line guys. First up is the new DS conversion that transforms the rear-motor Dual Sport into a mid-motor mayhem maker. The conversion includes shock towers, body mounts and a Kydex bumper. Multiple battery-mounting options allow the pack to be installed across the width of the chassis or along its centerline for roadcourse running, or on its left for oval action.

The Vulcan Pro transforms your RC10 into a killer smooth-oval machine. In addition to a graphite chassis and shock towers, the kit includes MIP CVDs, aluminum motor plates and front bulkhead, rear hub carriers and rear bearings. Don't forget instructions and hardware; they're in there!

If it's drag action you're lookin' for, look no further than the aptly named Funny Car and Dragster kits. Both graphite battery-mounting positions, traction bar, hollow-tube rear axle, quick-change aluminum motor plates, front and rear (whew!) body posts. Contact Grand Motorsports, 9360 Newton Ave. North, Brooklyn Park, MN 55444; (612) 424-5535;

machines offer several rims, tires, bearings and (612) 424-5757.



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- New Composite Rear Axle
- Purple Aluminum Screws

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KAWADA COMES TO THE USA

We get quite a few inquiries from readers asking where they can get Kawada's touring-car parts and minicars. We're pleased to announce that all things Kawada should soon be much easier to find now that Kawada USA is opening its doors. Mike Smith, who formerly imported Kawada products through his company, Sunrise R/C, will head up the U.S. operation. In addition to the hop-up parts featured in this month's "Project TAO3" installment and the M-24 Tripmate we featured in our January issue, Kawada USA will offer its line of bodies, motors, wheels, tires and more. You can also expect the Kawada racing sedan chassis, the SV-10, to be available soon. We can't wait to test it! For information, contact Kawada USA, 23324 S.E. 289th St., Kent, WA 98042; (888) 874-8508; fax (360) 886-2871.



Team Losi Double-XT 'CR' Graphite Plus

With Team Losi's graphite-laden Double-X 'CR' Kinwald Edition a certified hit, it's little wonder that a graphite-fortified Double-XT 'CR' has quickly followed in its wake. The new truck—the Double-XT 'CR' Graphite Plus—features Losi's full arsenal of graphite goodies (chassis, arms, braces, shock towers) as well as a whole passel of other hop-ups.

Check it out:

- Lunsford titanium turnbuckles
- Dual-disk slipper assembly
- Combo kingpin/ball studs
- Ball-bearing steering
- One-piece aluminum top shaft with integral gear
- Titanium-nitride shock shafts
- MIP CVD drive shafts

Like the Kinwald car, the Graphite Plus is much less expensive than a decked-out Double-XT 'CR.' Purchased separately, the optional parts would easily eclipse the extra \$60 or so it takes to get a Graphite Plus over the stock 'CR.'

Contact Team Losi, 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.



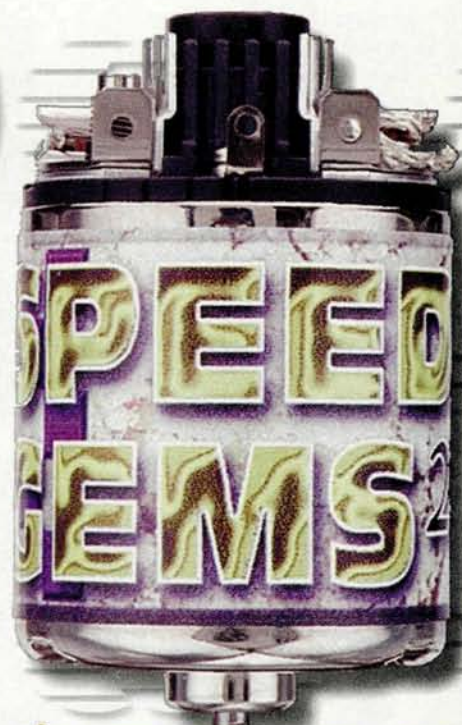
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- 9216 Jade, (15 Quad)
- 9217 Quartz, (19 Double)
- 9218 Opal, (10 Triple)
- 9219 Platinum, (13 Triple)

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Among the wave of new cars being released by Kyosho are these impressive machines.

The Subaru Impreza (top right) is one of Kyosho's Super Sport Ten lineup—a series that matches quality with affordability for entry-level drivers.

Kyosho's entry-level-car invasion

These cars are based on the venerable Outrage/Sandmaster chassis and pop out of the box 80-percent assembled. This means they will be easy to build and will withstand beginners' abuse (I'll have to get my hands on one of these).

In the bottom corner, you will find the Renault Laguna—one of the new additions to the Mantis series. The simple, partially assembled chassis has a rugged three-piece frame, 4W independent suspension (for smooth road handling) and a scale-looking body. These exciting new 2WD additions are both available in gas and electric versions with Kyosho's high-quality motor or engine.



OFNA Z10 HOP-UPS

OFNA has just added a couple more pages to its extensive lineup of aftermarket parts. As you can see by this small sample, OFNA offers a bunch of interesting parts, including Delrin diff halves (to reduce rotating weight in the drive train), a large selection of narrow and super-narrow rims in many colors and spoke patterns, and color-coded 5.5mm-(blue) and 7.5mm-wide (red) aluminum hex drives to fine-tune your car's width. Optional tuning springs and quick-change battery straps add to the personal-touch possibilities. For more information, contact OFNA Racing, 22600 Lambert St., Ste. D-1009, Lake Forest, CA 92630; (714) 586-2910; fax: (714) 586-8812.



Servos from Futaba



Futaba offers a couple of new servos to meet your linkage needs.

If you need something small 'n' fast, the FP-S9602 high-speed miniservo should be your hot ticket. This coreless-motor unit is blazing fast with a 0.09-second transit time, and it offers plenty of torque with 37.5 oz.-in. on tap. It's less than 1½ inches long, so there's a good chance you'll see more than a few S9602s in the 1/12-scale ranks this season.

The FP-S3401 is 30 percent faster than Futaba's S148 and 3001 "standard" servos and offers more torque as well (the specs are 44.4 oz.-in. torque and 0.15-second transit time). A metal idler gear enhances durability, and ball bearings help reduce friction and ensure a quick response plus super-smooth operation. Gasket seals on the standard-size case should make the S3401 ideal for off-landers.



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to *Car Action*, or an extension of your existing subscription. You'll also be eligible for the eighth annual "Readers' Rides of the Year Contest" in the fall of 1998. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

RS4 Ram

Some people think that their vehicles are a cut above the rest. John Pellerito of Yorktown, VA, is one of those people. His good-looking nitro RS4 has the official blue-and-white racing-stripe paint

scheme, and John took the time to install a full set of HPI ball bearings and a tuned pipe. The front and rear alloy shock towers are by Hammad Ghuman, and a .12 Nitro Star engine supplies the go power. John says the truck gathers a lot of spectators whenever he takes it out to "rip up the streets."



Smokin' Sprinter

Kevin Michlig of Colby, WI, spent a lot of time custom-building this sprinter. Under the handmade Lexan body lie a nitro-powered engine and a transmission Kevin borrowed from his RC10GT. An RC10's suspension parts serve as the main chassis components, and the roll cage is made of 3/16-inch tubing. The sprinter is tricked out with anodized screws, Lunsford tie rods, MIP CVDs, an O.S. tuned pipe and more. Kevin says his wild ride looks really cool as it hits serious speeds while smoke pours from its exhaust.



Monsters Senior and Junior

Mark Cunningham of Ajax, Ontario, Canada, put a lot of time into his two creations. Then he spent more time to make them look alike with that dual-wheel "monster" look. The custom-built "senior" truck has a full set of bearings and Trinity Monster Mash modified motors. Mark made the lower bumpers, brush guard, motor guard and 1-inch lift from aluminum, and he added quad shocks to all four corners. "Junior" is a modified toy vehicle. This pair gives new meaning to the phrase "looking out for the little guy."



Gone Racing

Benoit Begin of Valley Field, Quebec, Canada, races his Team Losi LXT at least once a week. It's hopped up with a Reedy Tri-Sonic 12 double motor, matched cells and a Novak Tempest ESC, and control signals come from a Futaba Magnum Sport radio. Pro-Line Edge front tires and Pro-96 rear tires supply the traction. The turnbuckles are titanium, and the stock steering has been replaced with ball-bearing steering. Benoit's friend Jeff painted the Protoform Ranger Nevada body—looks good!

Track Team

Rob Cline and Bryce Ondell from Dublin, OH, like to race their Team Associated RC10B2s—but it's hard to tell the cars apart while they're on the track! Both have a full set of Lunsford titanium tie rods, MIP CVDs, MIP light outdrives and a blue aluminum tranny brace and blue screws. The RC10 DS shown in the middle is just for parking-lot bashing, but they plan many hop-ups and a little racetrack action for it.



Machined MT-10M

Luke Chojnacki of Milwaukie, OR, is a fine example of a truck enthusiast who will go to any lengths to make his truck the best! Luke started with the essentials: ball bearings, Trinity Midnight motor, Sanyo 1500mAh battery pack, Futaba Junior radio and MC210CB speed control. Then he went on a machining spree and made his own servo mounts, battery hold-down bar and rear shock tower. After that, he added Traxxas captive ball ends and Losi springs to finish off his ballistic ride and increase its strength.



Hitched on R/C

Daryl Stever of Framingham, MA, pushes his trucks to the limit and says they perform flawlessly. The monster truck with the custom-painted Gravedigger body is built around a Tamiya Bullhead chassis, which Daryl hopped up with a wheelie bar, lift kit, front and rear double tube bumpers, front skidplate and aluminum Gravedigger body mounts—all from ESP. The truck pulls the RC10T around on a home-built trailer made of wood and old skateboard parts. The RC10T has a Dahm's Rammer body and Pro-Line Road Hawg tires on HPI Pro Star wheels, and it's powered by a Sapphire Motor and Dynamite 1500 6-cell pack. Looks like a lot of fun, Daryl!

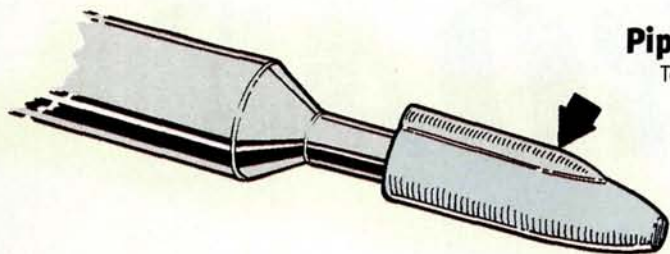
Really Rally

Ben Hamdani decided to jump on the rally-car bandwagon and convert his Tamiya Top Force Evolution into a radical rally ride. The Top Force is propelled by a Trinity Team Gold Dust 12-turn motor, a 1700mAh SCRC battery pack and a Novak Tempest Pro ESC. The body was painted to replicate the real Ford Escort rally racer. Ben also shows off his Kyosho MP-5. With an O.S. MAX RZ-B(P) and 2020 tuned pipe, the car is "silly fast."



NOVAK
ELECTRONICS, INC. RACING TEAM

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



Pipe Cap

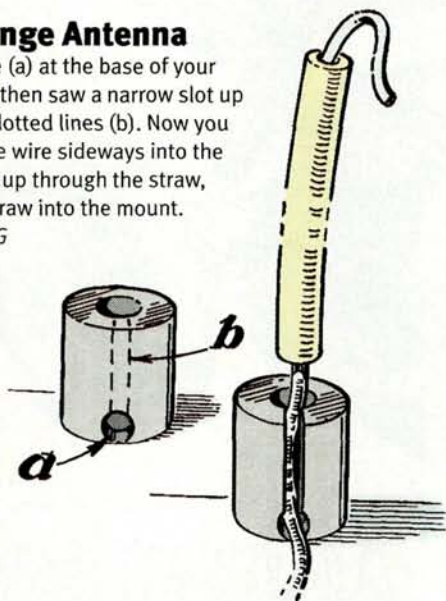
To keep out dirt and condensation between runs, seal off the exhaust with a large pen cap stuffed with a small wad of tissue to absorb oil drips. Note that the pocket clip (arrowed) has been cut off.

ERNIE WOLFORD
Cardington, OH

Quick-Change Antenna

Drill a small hole (a) at the base of your antenna mount, then saw a narrow slot up the side on the dotted lines (b). Now you can just push the wire sideways into the mount, thread it up through the straw, then push the straw into the mount.

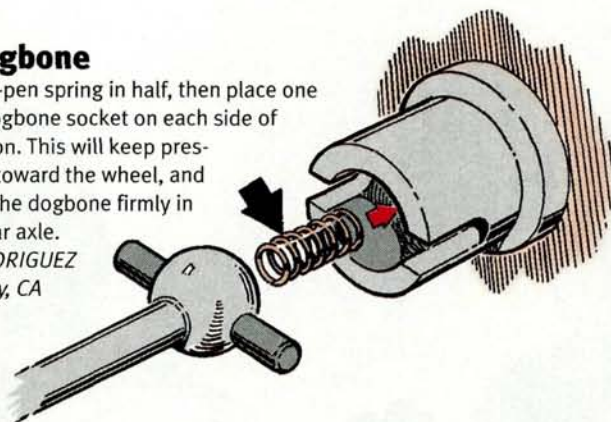
CHAD PICKERING
Sherwood Park,
Alberta, Canada



Pushy Dogbone

Cut a ballpoint-pen spring in half, then place one half into the dogbone socket on each side of the transmission. This will keep pressure outward, toward the wheel, and will also keep the dogbone firmly in place in the rear axle.

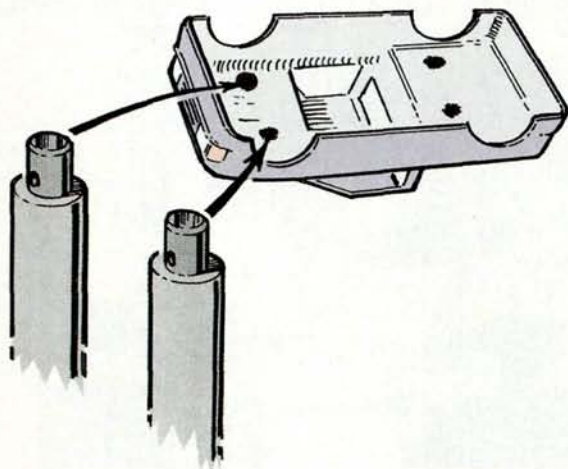
JONATHAN RODRIGUEZ
Canyon Country, CA



Greasy Tip

If you painted the body before you drilled the mounting holes, do this to mark their positions: smear a little grease on top of the posts, set the body carefully in place, then lift it off again. The grease will mark where to drill the holes.

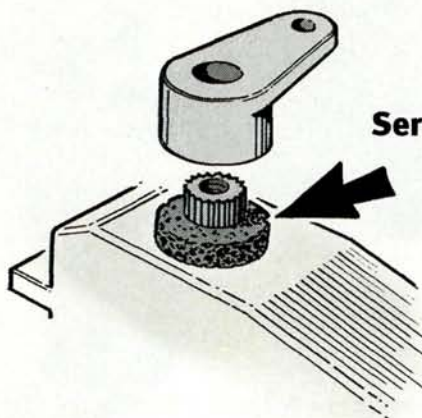
GREG HOLCOMB
Adkins, TX



Servo Seal

Keep dirt and even a few light water splashes out of your servo by placing a Losi Foam Thing around the servo shaft before putting the servo arm into place.

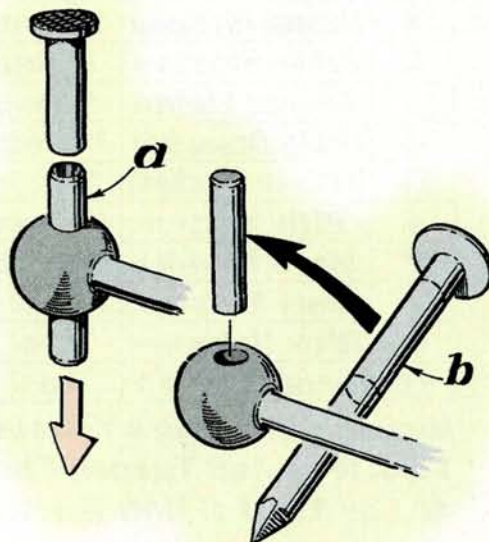
STEPHEN MORELLI
Ventura, CA

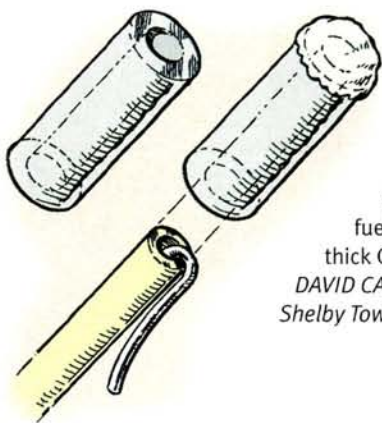


Get It Nailed

In an emergency, worn or lost dogbone pins can be replaced with a section cut from a nail of the same diameter. Use a piece of the nail to drive out the worn pin (a), cut off a section (b), file the corners slightly to remove the burrs, then carefully tap the nail piece into the dogbone. If you can't get a tight friction fit, a drop of CA glue will hold it in place.

JEREMY FUNK
Altona, Manitoba, Canada





Cap It

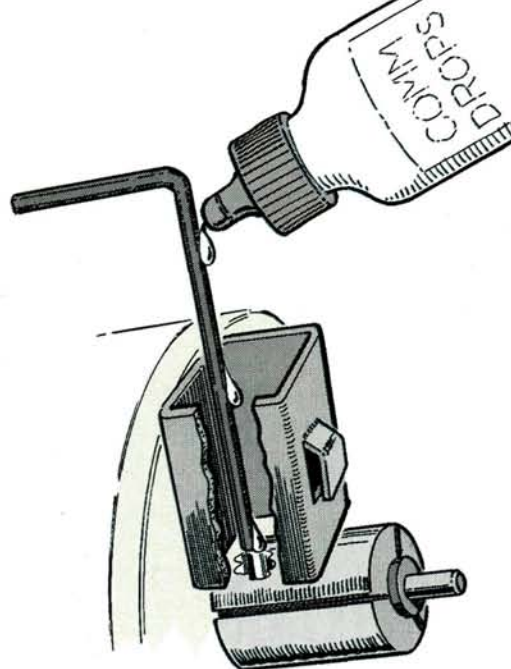
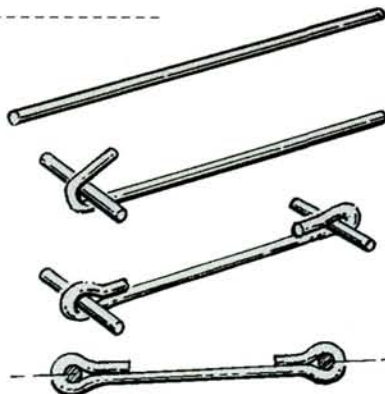
Antenna straws can be capped with a short piece of fuel tube sealed with a drop of thick CA or a spot of hot glue.

DAVID CASACELI
Shelby Township, MI

Lost Dog

A lost dogbone can be temporarily replaced with a homemade version. Cut a piece of thick coat-hanger wire, then bend the ends around two shorter pieces, squeezing them in a vise to trap them in place. To help secure the pins, put a large drop of thick CA or epoxy on them.

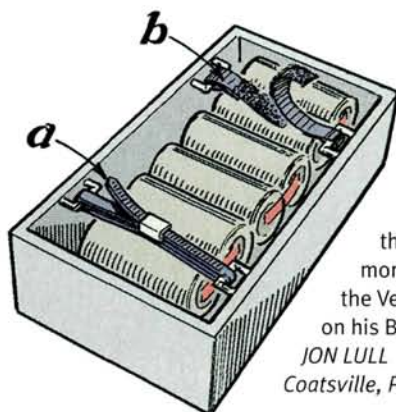
NEAL WOJTOWICZ
Nashville, IL



Drops on Target

If the nozzle of your comm-drops bottle is too stubby to reach the commutator, dribble the fluid down the side of a small Allen wrench, as shown.

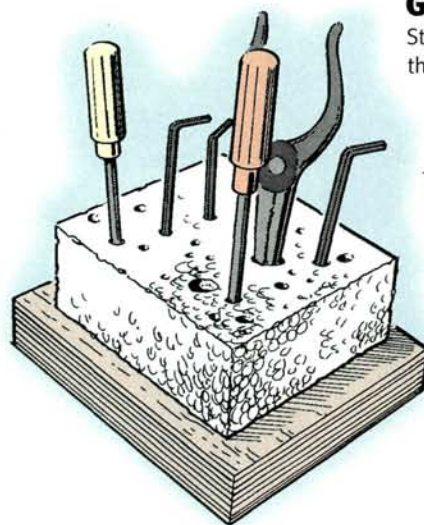
KEVIN HASTINGS
Tehachapi, CA



Zip or Stick

On your battery box, where they are used, you can replace zip-ties (a) with Velcro® (b), which will still hold the cells securely—no more buying ties. Just pop the Velcro® open. Jon did this on his Bolink Legends car.

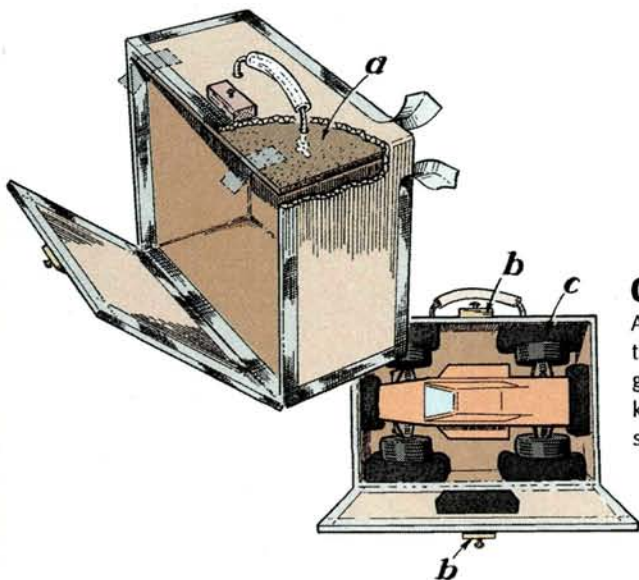
JON LULL
Coatsville, PA



Getting Stuck

Stick your tools into a thick, insulating-foam block where they will be instantly accessible. To prevent it from tipping over, glue the foam to a heavy wooden base.

GEORGE LEONG
Brooklyn, NY



Card Car Carry

A suitable corrugated card box, strengthened at the corners, edges and hinges with duct tape or reinforced gummied package tape, makes a safe carrying case for your cars. Hot-glue a plate of Masonite or old plywood paneling (a) inside the top, drill through, then knot a handle of thin rope and plastic tubing through it. Wooden blocks with protruding screws (b), hot-glued as shown, fasten the lid with a rubber band, or you can use Velcro®-brand fastener straps, shown by dashed lines. Glued in foam sponge blocks (c) to prevent the box's contents from moving and being damaged.

FRANCIS GRABETZ
Nepean, Ontario, Canada

Vexing 'Vette

First, let me say that you guys rock! Next, let me say "Help!" I have an original Kyosho High Rider Corvette. I never did get it to run properly



when it was built because something is wrong with the throttle. Reverse doesn't work at all, and when you let off the throttle, the car just keeps going as if you still had the accelerator pegged! Needless to say, this is a real problem for me, and I would appreciate any help you can pass along.
Robert Pratten II
Pace, FL

Robert, I must have built more than a dozen of those High Rider 'Vettes when they first came out! They're really neat, realistic monster trucks with ground clearance that just won't quit. I did learn three things about making them work properly, however, and I'll share them with you. First, you need to open up the gearbox and relieve the large bushing that the diff rides on; these are the big metal or plastic bushings that you had to press into the shell of the gearbox, and they don't provide enough clear-

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to *Troubleshooting, Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

ance to allow the diff to rotate properly. Use a flat file or some coarse sandpaper to thin each one down until the parts rotate freely, then reinstall the case. You'll be amazed at how freely the gearbox moves! Next, replace the stock upper-suspension links with Rocket City no. 87 ball ends and a few pieces of 4-40 threaded rod. For less than 10 bucks, you'll eliminate the annoying "popping link" syndrome that's part of the 'Vette (and the Double Dare) design. Last, toss out the mechanical speed control and buy an inexpensive ESC. I was never able to figure out how to make those things work; too many wires, connectors and protective covers in a space that's just too confined! I've had good luck with the Novak Explorer in that application, and it can even handle a mild modified motor, if you feel adventurous!

Re-volting Development

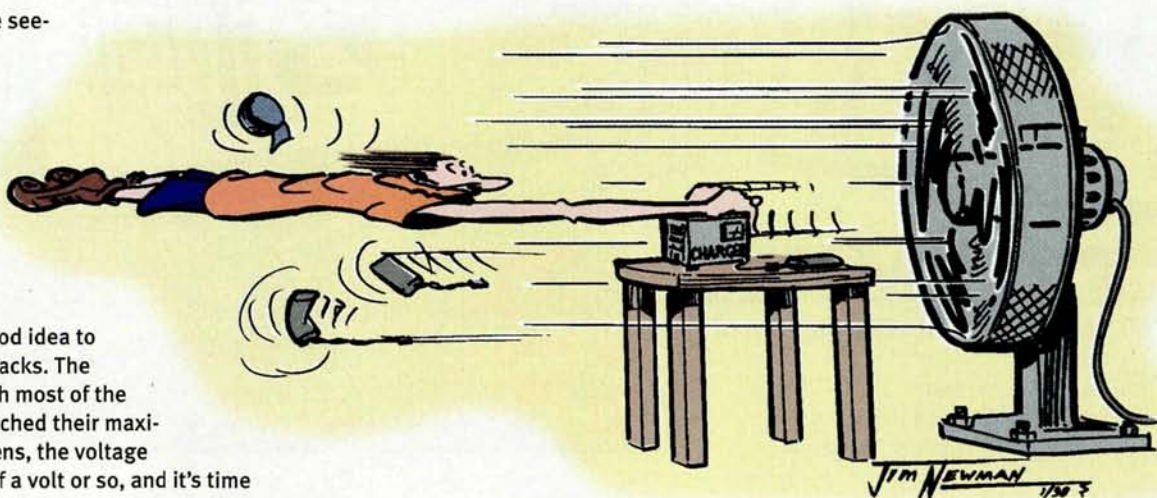
My Dynamite Mega 2 charger doesn't seem to be working as well as it did when I bought it. Whenever I charge a 1500mAh battery, the charger gets really hot after about five minutes; it used to take 15 or 20 minutes to get that hot. I hooked up a voltmeter to the charger, but I didn't get a clear, stable reading; it seems to jump around by a tenth of a volt or so all the time. Could this be a result of overcharging my battery packs? I know I'm supposed to use a .75A fuse, but my hobby shop only stocks 1As, and they don't pop the way the .75s are supposed to when I've overcharged a battery. I've already ruined three batteries, and I'm probably on my way to ruining a fourth. Please help!

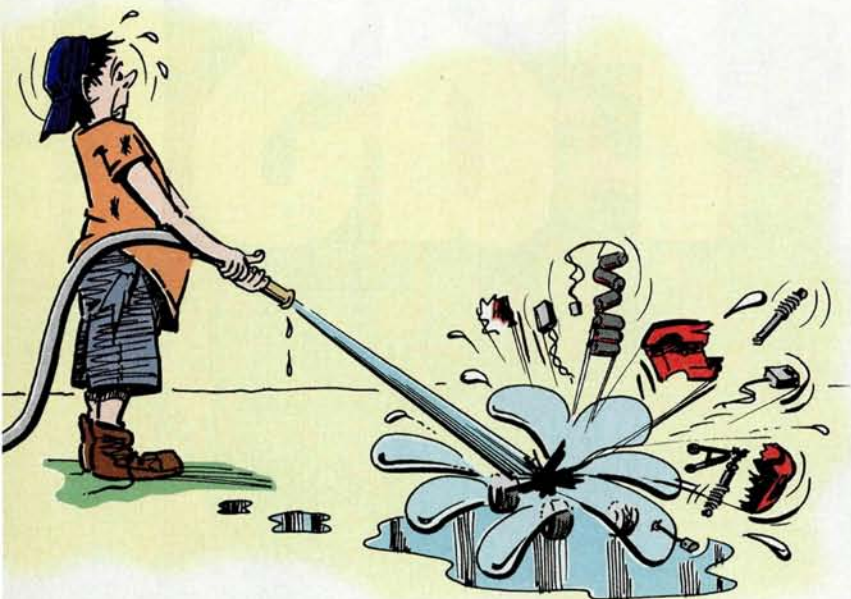
SCOTT LAWAN
Englewood, CO

Scott, that voltage jump you're seeing on the digital meter is the result of having cells with widely varying voltage and capacity ratings combined in the same pack. Cells with comparable ratings tend to charge at a much more stable rate. Although it was a wise move to hook up the voltmeter to check things out, it's also a good idea to use one to peak-charge your packs. The pack will reach a point at which most of the cells will have pretty much reached their maximum charge. When that happens, the voltage reading falls off by a quarter of a volt or so, and it's time

to take the pack off the charger; any longer, and you risk overcharging it. It's possible that you have damaged your Mega 2 charger, but I wouldn't assume that it's time to dump it just yet. Your real problem may be that your packs are getting old and, therefore, have a higher internal resistance. That means just what it sounds as though it means: they resist taking a charge more than they used to. This makes your charger work harder and when that happens, it heats up.

To prolong the life of any charging equipment, have a small fan blow on it to maintain airflow. Replace your fuse with one that's the proper amperage, even if you must order it from an electronics supply house. Keep in mind, though, that fuses don't prevent overcharging; they are there to prevent damage to the charger from a short or an incorrect hook-up.





Adjustment Problem

I have a Team Associated RC10GT Sport truck that's stock, except for MIP CVDs and a Dynamite 12PD with an MIP Buttsink. I need help figuring out how to adjust the carb and the slipper, because I'm not really sure how they should sound or how they should perform. Also, after I run the truck, can I just wash out the chassis with a garden hose—with the electrics in—or will that mess things up? How do you recommend that I clean my truck? Keep up the good work!

MATT THOMPSON
Allen, TX

Matt, as you have discovered by now, nothing is more fun than ripping around with a quick RC10GT on a sunny afternoon! Assuming your engine is fully broken in, be certain that the idle screw is set according to the recommendations from Dynamite and don't mess with it any more. The throttle screw should be set progressively leaner (turned clockwise) until the motor responds rapidly. A motor that drones and honks is set too rich, especially if you see clouds of blue smoke coming from the exhaust pipe. It's too lean when the motor starts to ring, and it sounds a little shrill; that's because there's insufficient fuel to cool and lubricate the motor's innards, especially the piston. To adjust the slipper, first be sure that the differential is set properly (see

the RC10GT's instructions for the correct settings), then have a friend hold both rear wheels so they don't spin. If you can just barely turn the spur gear, you're in the ballpark. Since you won't be able to hear the slipper operate over the din of the engine, you'll need to check the adjustment visually; you should be able to launch the truck hard without lighting up the tires, but the tires should be roosting up dirt after six feet or so. When in doubt, it's better to set the slipper a little tight than to set it too loose.

It's OK to hose down the truck, but only after you've removed the engine and the electrics. Or, leave the electronics in and spray the truck with denatured alcohol, which is less corrosive and safer. If your truck is covered with old fuel and is really greasy, a little Simple Green cleaner/degreaser—available from auto-parts stores—will do a good job of getting down to the metal and nylon.

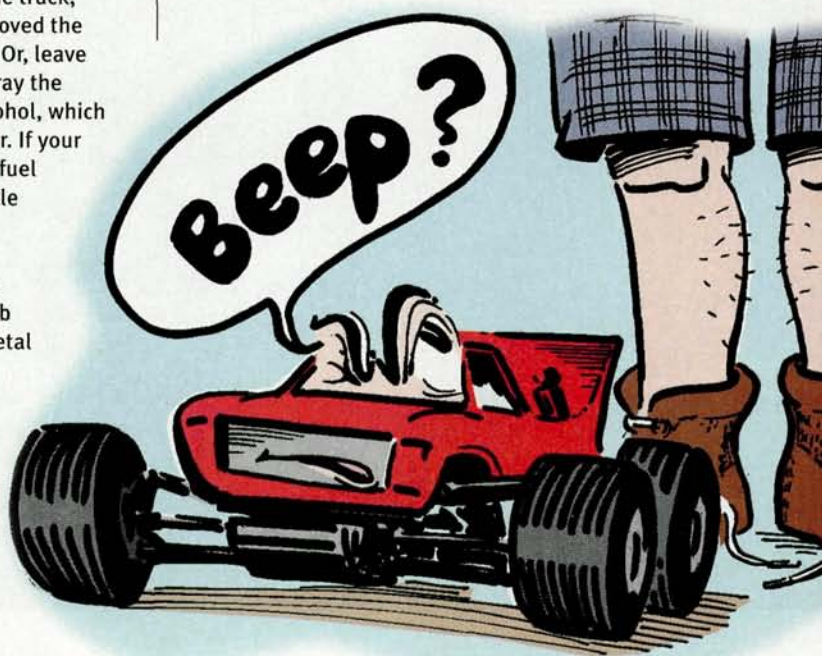
Out Of Contact

I have a Losi Double-XT with a Novak Duster, a Futaba radio system and a Sanyo 2000 battery pack. I changed the connectors, charged my battery and tried to run my car, but there's something wrong! Instead of accelerating, the car makes a beeping noise. The steering works fine, but the throttle doesn't. I charged and discharged the battery a couple of times, and then it worked fine; but later, it started to do the same thing again. Any ideas?

DARKO STOJANOVSKI
Rochester, NY

Darko, I think you are the victim of two non-serendipitous occurrences! In changing your connectors, you probably decided to go with one of the low-loss units such as those made by Deans, Race Prep, or Sermos. I don't know what your soldering skills are like, but it's very easy to wind up with a cold-soldered joint that looks good but passes voltage only intermittently. Always use rosin flux when you solder wires to connectors, and before you solder, abrade the surface of the connector contact with a file or sandpaper.

I really think, however, that your motor problem is unrelated to your new connectors, because the steering channel works; this indicates that the receiver is getting power from the ESC and the battery pack. And the motor beeps, which indicates that it is receiving some sort of voltage, as well. My guess is that you have a hung brush on your motor; this means that one or both brushes are not making reliable contact with the commutator. Perhaps the comm is dirty, the brushes are too short, the springs are too weak, or there is some fine debris caught between the brush and the comm. Take out the brushes, compare their lengths to new ones and replace them, if they seem very short. Clean the comm and be sure that the lever arms of the brush springs look pretty much the same. Put it all back together, and I'll bet that your problems will be solved!



What I've learned from street spec racing

Gettin' it together

I recently became fascinated by Street Spec racing—the class spearheaded by Trinity, TRC and Bolink. To attract and retain more racers, Street Spec uses rules that dictate which chassis, bodies, tires, screws, motors and batteries can be used and put a dollar limit on speed controls.

It's a noble idea that has gained popularity every year because of its relatively low cost and maximum fun potential. Track owners say that they can get new drivers into a competitive rig for \$250 to \$300, while experienced drivers need only purchase the appropriate chassis, batteries and motor.

After reading the series rule book, I shopped around and bought a TRC* stock car kit that came with a legal motor and battery pack. Even after buying an additional four packs (I hate the idea of running a pack more than once a day), a Novak* Duster II ESC and several pairs of spare tires, my total investment was well under \$300. Since the rules prohibit the swapping of many of the stock parts for alternatives, there isn't a whole lot more to buy.

I already had an older KO* EX-1 AM radio on 27MHz, a Hobby Shack* Cirrus CS-90 2BB servo, and a Tekin mini AM receiver; together, they formed a solid control platform. Assuming I don't break too many parts, this stuff should see me through several seasons of racing. I figure that I'll only have to replace the tires, an occasional body and a motor every year or so. That's cheap racing!



No need for ultra-expensive electronic components! The rules limit how much you can spend on a speed control to \$129.99; this Duster II by Novak fits the bill quite nicely.

FRONT END TUNE-O-RAMA

Even though there aren't many tuning options, these cars are set up just like the more complex and expensive pan cars you'll find at regional and national championships. It's important to assemble things properly and keep it all clean and well maintained.

You can replace the kit bushings with front wheel bearings; that results in a big reduction in rolling resistance, but only if you keep those bearings clean and free of carpet fuzz. After every carpet run, yank the E-clips off the axles and remove the carpet fibers, or your wheels will bind up as if they've been epoxied.

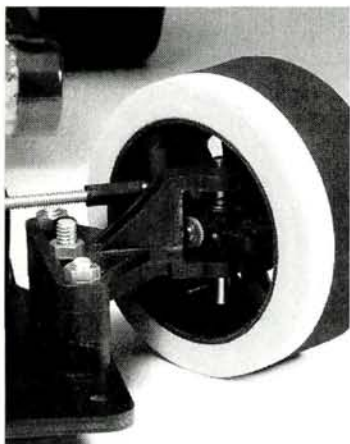
Front springs can also be exchanged; softer springs give more steering, while harder ones reduce steering response. If you want just a tad less steering, put a little thick silicone or diff lube on the kingpins to provide more suspension damping.

Though it isn't legal to adjust camber, caster can be altered by inserting old-style Associated* caster wedges or washers beneath the steering arms. These come in 2-

degree increments, so you probably won't need more than two for each side; I can't imagine anyone wanting more than 4 degrees of caster.

Although turnbuckles are strictly forbidden, you can adjust toe angle pretty accurately using the kit's threaded rods and nylon ball ends. More toe-in makes the car stable on the straights and reduces steering response; toe-out may get the chassis a little twitchy, but it increases initial turn-in.

Experienced pan-car dogs will recognize the old, Associated-style, front-end parts on the TRC car. Within the Spec rules, wedges can be inserted under the arms to increase caster, and springs of varied stiffness may be installed.



BODIES & BATTERIES

While some racers may argue the various merits of Ford or Chevy car and truck bodies, there seems to be little actual performance difference between them. That means you can mount the one you like best without worrying about the choice you've made.

To protect my car's lovely short-track Lumina body, I fastened a TD* Protector foam front bumper to the front body posts. TRC also makes a first-class foam bumper that's spec-legal. The car body comes with a molded-in rear spoiler, and I can't imagine needing to make it any taller.

The rules indicate that the track director may specify whether wings are permitted; they may be fastened to the body with wing buttons or to the rear pod using the kit's included wing mounts. I have yet to find a track on which rear wings are needed or allowed, but if you attach one to the pod, you'll have to cut two holes in the body for the wing wire to pass through. Make sure the holes are large enough to allow sufficient clearance for full rear pod movement.

According to the rules, you can use O-rings, zip-ties, or reinforced tape to hold the battery pack in place; of the three, I recommend tape. I found that O-rings stretch and break too easily, and zip-ties allow the pack to slide around too much for my taste. Reinforced tape sticks to both the battery pack and the upper pod, and it does a better job of keeping everything in place.



DIFFERENTIAL DIFFERENCES

Diff settings make a big difference to the way a car handles, and this is one area in which paying a lot of attention can reap big dividends on the track. A stiff, tight diff will make the rear end kick out and slide after a few minutes of racing, while a smooth, free spinning differential will allow each rear wheel to travel at its proper speed for maximum traction control.

The rules allow you to substitute bearings for bushings in the diff hub—an inexpensive upgrade that I highly recommend. Before you coat them sparingly with the kit's paste-type lube, make sure that all the diff balls and the thrust bearing are spotless. If you wish, it is legal to glue or tape the diff rings in place (pinning is not legal). Even without this step, differential action is quite smooth.

The steel axle and metal hubs ensure a reliable (if somewhat heavy) diff assembly that should last for years. Note the threaded holes provided for the included wing mounts. Spec rules leave the legality of wings up to individual track operators.

POD PEOPLE

Out back, the rear pod is controlled by conventional damping mechanics that are easy to adjust. The T-bar is attached to the chassis with flat-head screws, and there are O-rings between the bar and the holders; tightening the screws reduces mechanical traction, but you never want them so loose that the bar wiggles back and forth.

Damping is provided by a pair of spring-loaded nylon pucks that sandwich the upper pod plate. Side-to-side damping is adjusted by increasing the spring pre-load on the pucks and by varying the viscosity of the fluid used on them. A thick, sticky substance will slow down the pod and provide more turn-in on high-traction surfaces, while thin fluid will loosen the pod on untreated asphalt or concrete and prevent the rear end from coming around too quickly in tight turns. Try using Trinity's White Stuff (medium), Red Stuff (heavy), Purple Stuff (extra heavy), or Joel Johnson's Slippage to tune your car's pod.

HOW HIGH?

Ride-height adjustment is critical on any carpet car. Minimum ride height may be dictated by your track's rules, and you should always run your car as low as possible for maximum cornering speed, but I always set my cars up with the front end just a little lower than the rear. A lower rear will give you more traction, but it may push when you're on the gas and hook when you let off.

Since there are only two rear- and three front-tire compounds to choose from, I went ahead and bought spares in each compound. These have a distinctive gray band that marks them as class-legal, and they come pre-trued at 60mm.

You aren't allowed to do anything with the motor except break it in and lube it, although most of the track owners I spoke to said that the brushes that come installed on it are not legal for the series. You can use only Trinity's Spec brush, which is easily identified by its two-tone lead. Although you can solder the brush leads to the brush hoods, you aren't allowed to cut, file, shape, or use any other secret brush techniques. Now, that's what I call fair racing!



The pod's ride height may be adjusted via offset axle-bearing inserts. Proper ride height is critical to spec-car handling.



A collar is used to adjust the pre-load of the damper puck springs. By lubricating the puck with fluids of different viscosities, you can alter roll rate and traction.

At this point you might be considering the old pan-car trick of wet-sanding the upper pod plate and pucks with 600-grit sandpaper. Don't do it! This is illegal under Spec rules. Remember: if the rules don't specifically say you can do it, it's illegal!

To set the ride height, the TRC chassis uses two short pieces of silicone tubing on a rod that passes through a short aluminum post. I simply moved the steel collars until the T-bar was flat when viewed from the side with all of the electronics on board. Too much preload will make the car jumpy and dart around, while too much T-bar sag will make the rear end lazy and slow.

ARE WE READY YET? ...

... well, just about. I cycled all five battery packs and was amazed to find how similar they were: their run times were within 10 seconds of one another, and average pack voltage readings during discharge were within 3/100. The numbers themselves aren't very impressive (hey, these are inexpensive batteries!), but they are impressively consistent.

To complete my spec racing package, I've put together a small spares kit with extra caster wedges, front springs, damper fluid and a selection of tires.

Over the next few months, I'll be running at selected Street Spec Series oval and on-road races within driving distance of my home. I'll be sharing what I learn along the way, so watch this space for more street-spec updates.

**Addresses are listed alphabetically in the Index of Manufacturers on page 201. ■*



The Atom Simply Elemental

The rumors are true — Team Novak's engineers have once again created a dynamic speed control that is destined to become a favorite among serious R/C car racers.

If you were drawn to the small size and programmability of the Cyclone, the *IFMAR 2WD World Champion*, then you'll find the Atom Fully Programmable Speed Control especially appealing.

All In The Family

The Atom is a direct descendant of the Cyclone, but with a **25% smaller footprint (1.23" x 1.16" x 0.69")!** The advanced technology and programmability of the Cyclone have been passed on to the Atom, making it the **smallest, fully-programmable speed control available.**

Although many speed controls are touted as being programmable, a detailed comparison of the Atom and Cyclone with other speed controls will show that Novak's programmable ESCs are by far technologically superior. **With the Atom and Cyclone, racers are given more programming flexibility.**

More Great News

If you already own Novak's **ESC Profile Software** or **Pit Wizard**, great news: you can also use them with the Atom. Like the Cyclone, the Atom comes with **three different racing profiles** for you to try. However, with programming capabilities at your fingertips, why not customize and store your own preferences? **10 adjustable operating parameters allow over half-a-billion programming possibilities!**

Other features of the Atom: **One-Touch Set-Up, HYPERFET III Transistors, Polar Drive Technology, and Radio Priority Circuitry.**

NOVAK ELECTRONICS, INC.
18910 Teller Avenue, Irvine, CA 92612
• (714) 833-8873 •

Advertisement TS# 50

Oil content

You have the right to know!

Do you want to try glow power so badly you're hearing a 2-stroke screech in your head that won't let you sleep? Have you been wanting to try piston power but don't know where to start? Do those nitro powerplants present an intimidating mystery? Or do you already have a cranky engine that you'd like to modify with a sledge hammer? If you answered "Yes" to any of the above, you've come to the right place. Welcome to my new column!

The popularity of gas power is growing faster than ever, and there's no end in sight. I'm sure that at this very moment, many of you are responding with a "Duh, Chris" to that opening statement. I merely point out the obvious because this growth is, in a way, unique. It includes those who are totally new to our great hobby as well as those who have experience with electric power but are new to glow engines. I hear from both. I've been receiving more and more letters and email from readers who have questions about or are having problems with glow engines. So many of these problems—which, at times, can drive you crazy and might even turn you away from glow forever—are easily avoided. You need only to understand the 2-stroke glow engine and treat it properly. It's really all very basic.

When I was nine, my father gave me a miniature steam engine for Christmas. I watched its puffing and clattering for hours on end. I would run it in one direction, stop it and then run it in the other way—totally riveted. I was a mesmerized fool—changed forever.

From then on, I've always loved engines, be they gas, glow, diesel, rotary, radial, migrating-piston, turbine, Wankel,

2-stroke, or 4-stroke. To me, engines are living, breathing metallurgic masterpieces in multiple polished alloys working in harmony. I've fooled with engines for so long that I've made all the mistakes. Some of you guys flatter me with the word "guru" when you write in. If you'll agree to my definition of that word: *guru—someone who has made all the mistakes at least five times each*—then, fair enough: I'm a guru.

My prime objective in this column is to address the realities of everyday hassle-free engine running, not to deliver imperial data from the laboratory or pontificate from a podium. From time to time, I will bolt an engine into one of my chassis and include a mini engine report, which will assess user-friendliness, vibration levels, ease of starting, idle and, most important, throttle response. In my humble opinion, throttle response is even more important than top end. I can't tell you how many races have been lost because of throttle hesitation coming out of turns.

This column will address everything and anything related to R/C car engines: fuel, maintenance, glow plugs, on-board igniters, clutches, ignition systems, fuel pumps, fuel filters and after-run care and oils—

you name it. And I mean that literally; I want you guys to "name it" by snail-mail or email. If you have a problem, or there's a product or an engine you want to know more about before you buy it, please let me know. I will respond to as many inquiries as I can.

FUEL UP TO COOL DOWN

I want to start this column off with a bang, and I can't think of a more "explosive" topic than fuel. Though it's true our alcohol engines have cooling fins and are air-cooled, I always think of them as being liquid-cooled. This thinking keeps me in the, "Run it rich, stupid" frame of mind. The stuff that spews out of the exhaust pipe (oil and unburned alcohol) expels tremendous heat. The fuel in an alcohol/glow system powers, lubricates and cools the engine. What could be more important? Obviously, fuel choice is vital and should be approached accordingly. If price, for example, is your sole consideration, in the long run, you'll spend much more than you bargained for.

My ideas on fuel are simple: if your engine's manufacturer recommends fuel with a certain percentage of lubricant, you'd better stick to it. O.S. and Thunder Tiger



recommend fuel with no less than 18 percent lubricant, and Enya specifies 20 percent for break-in and 15 percent for running. Don't let any self-anointed "expert" talk you into second-guessing the engine designers. The factory guys *know* what the hell they're talking about.

Many of today's manufacturers offer excellent warranties—far better than ever before. So you should do your part to protect your engine. And above all, remember this: the manufacturers who back the warranties will honor or void your warranty according to whether you followed or ignored their instructions on engine care. So who do you think you should listen to?—the manufacturer or big-mouth Joe "know-it-all-about-everything" who hangs out at the track? See how much help he is when you burn up your engine!

And that brings me to another really important point in my opinion: I would only use fuels

whose manufacturers tell you, on the product label, the fuel's exact lubrication volume by percentage. Some think they must keep the percentage a secret. Why would they do this? Do they think that YOU CAN'T HANDLE THE TRUTH?! There are reasons, but that's another subject for another time.

Don't let anybody tell you a simple percentage is an "industry secret." If companies want to keep such information under wraps, let them keep their fuel. With prices as they are these days, you don't want a "mystery blend" to pass through your expensive engine. You want peace of mind. You want to know you're complying with manufacturer's specs and that your precision powerhouse is properly protected! The bottom line is this: you're the customer; you have the right to know. Exercise your rights by buying fuel from companies that don't keep you in the dark.

(Continued on page 191)

Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



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Associated Dual Sport Mounted Foam Racing Tires



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ASSOCIATED

Dual Sport Mounted Foam Racing Tires "Hangin' with the Foamies"

Team Associated* recently released new mounted foam tires for the RC10 Dual Sport and RC10 Nitro DS Series cars. The high-traction green-compound rears and black-compound fronts are meant to provide a perfect combination of front and rear traction that will give the DS a big handling advantage on prepared asphalt and carpet surfaces. The new tires come pre-trued to optimum ride height, and they are mounted on Associated's scale-looking black DS Series wheels. For racers who prefer to mount their own tires, Associated sells the wheels and tires separately.

DIALING IN THE FOAM

Install the foam tires and set up your car as recommended in the instructions. Pay particular attention to the section on setting the chassis tweak. The DS kit comes with 20WT silicone shock fluid, but I recommend that you fill all four shocks with Associated 30 to 40WT silicone shock fluid instead. You'll experience less body roll with the thicker shock fluid. The stock no. 1 pistons and soft black springs will work just fine for most applications.

Install all the radio gear (including motor and battery) and then check the ride height. You'll notice that the chassis will settle a little closer to the ground with the foam tires installed. This is because the foam tires are trued to a smaller diameter than the stock, rubber-compound tires. The car will handle better because of the lower center of gravity (CG), but you may need to install additional preload spacers on the shocks to prevent the chassis from bottoming out on the track.

Set all four wheels at 1.5 degrees of negative camber (I suggest that you pick up an RPM* camber gauge, part no. 7099, \$9.99). This is a good starting point. Next, run a couple of battery packs, then check the tires for wear. If you notice that the tires are more

worn on the outside than on the inside, shorten the camber rods slightly; if the tires are more worn on the inside, lengthen the camber rods slightly. The goal is even tire wear. Even tire wear is a sign of maximum adhesion, and that's what racing is all about—keeping the car stuck to the ground.

SAUCE 'EM UP

The nice thing about foam tires is that they can be "sauced"; in other words, you can apply traction compound to the front or rear tires as necessary. If you need more front traction, you can sauce the front tires. If you need more rear traction, sauce the rear tires—you get the idea. This is a great tuning aid because you can instantly gain traction where it's needed without making any other changes to the suspension.

If the racing program you participate in allows the use of foam tires, I suggest that you try a set. You may add a couple of laps to your best time! Although the foam tires won't last as long as the stock rubber tires, their lower price alone justifies the purchase. Of course, when you factor in their performance advantages, you'll discover that they're an absolute bargain.

—George M. Gonzalez

	Part no.	Price
Mounted foam DS tires	8888 (black, front)	\$10
	8898 (green, rear)	\$11
DS wheels to fit foam tires	8883 (front)	\$5
	8893 (rear)	\$5
Unmounted foam tires	8130 (green)	\$6
	8131 (black)	\$4.50



OFNA

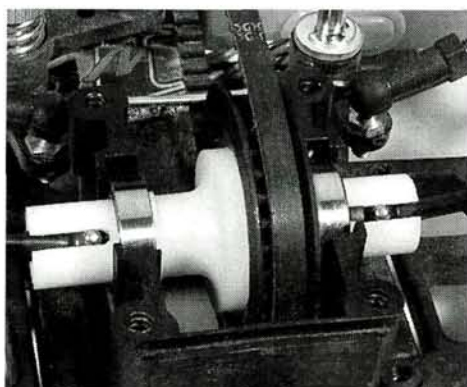
Delrin Diff Halves for the OFNA Z10

The White Light

Offering the lure of reduced rotating weight in the drive train, plastic diff halves are emerging as a hot hop-up for touring cars. Quicker acceleration and potentially higher top speeds are the promises of these lightweight parts. OFNA's* replacement Delrin (an extremely strong engineering plastic) diff halves are designed to enhance the already potent performance of that company's Z10 and Z10 Pro touring cars.

THE LIGHTER SIDE

The two diff halves plus the included ball bearing, thrust screw and nut weigh a total of 7 grams. The stock units with just the screw weigh 26 grams—big difference! Replacing the front and



The assembled package looks pretty trick, doesn't it? The white Delrin plastic does get a little dirty during use, but it's nothing a cleaning brush can't fix.

rear diff halves with the Delrin units trims a total of 38 grams. This weight reduction would be impressive for static parts, but when that fat comes off rotating parts, real performance gains can be expected.

PERFORMANCE

Do they make a difference? You bet! I quickly slipped the new Delrin diff halves into the front and rear of my Z10 Pro. I was already impressed with the Z10 Pro's acceleration in stock trim, but with the lighter parts, it was amazing. Acceleration improved noticeably, and a few packs' worth of hard launches appeared to have no ill effects on the diff halves.

I'll be "long-term testing" the Delrin diffs for durability, but I don't expect any problems with spreading or breaking; the drive axles sit deep in the diff halves, and the walls of the outdrive portion are quite thick. If you're looking to increase the racing advantage of your Z10 or Z10 Pro, the Delrin diff halves should top your upgrade list.

—Greg Vogel



The parts used to replace the stock diff halves; the ball bearing replaces the one in the center of the diff pulley; the screw and nut hold the unit together. This total package weighs 7 grams.

PRO-LINE

Pre-Assembled Sedan Tires

Capped Tires for your Tourer

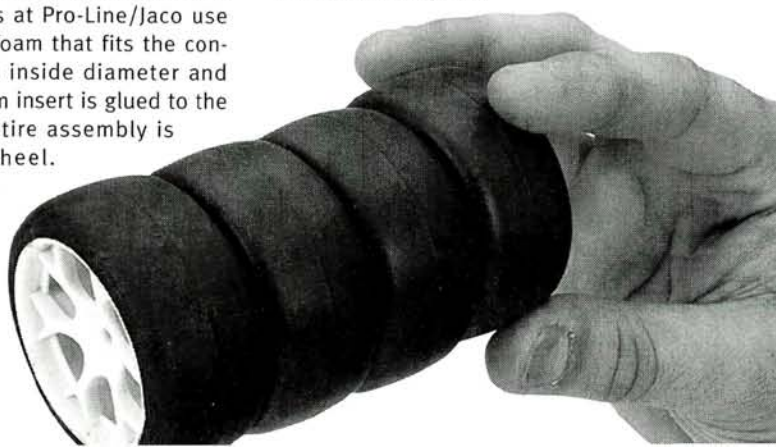
Pro-Line* has always been a dominant force in the off-road racing segment of our hobby. With the release of the company's low-profile, S2 and S3 compound slick tires in standard narrow and super narrow widths, Pro-Line made its mark in the highly competitive touring-car genre. Now, Pro-Line has upped the ante in touring-car tire technology by introducing its new 1/10-scale Pre-Assembled Standard Width Sedan Tires.

Using capped-tire technology from Jaco, the new pre-assembled tires offer

advantages that cannot be matched, at least in the experience of this editor, by most other tire/wheel/foam-insert combination. Instead of using regular foam inserts that can move around inside the tire, the engineers at Pro-Line/Jaco use precision-formed foam that fits the contours of the tire's inside diameter and sidewalls. The foam insert is glued to the tire before the entire assembly is bonded to the wheel. The results are tires that spin truer and will

not expand or flex, regardless of rpm or cornering forces. The tires are available in two compounds and come mounted on Pro-Line's stylish-looking yellow Warlock
(Continued on page 60)

The tires are so sticky that they'll practically bond to each other. I had to really shake them to break up the group.



Pro-Line Pre-Assembled Sedan Tires

(Continued from page 58)

wheels. The Green (medium) compound is made from a soft, high-traction rubber that offers plenty of bite and long life. The Yellow (soft) compound is made from a super-sticky rubber that provides maximum traction while still outlasting most conventionally assembled competition tires.

I decided to try out a set of Yellow compound pre-assembled sedan tires on my Tech Racing Voggard T-10 touring car because I have been running it with a complete set of Pro-Line standard narrow S3 compound tires, and I thought it would be interesting to compare them to the new tires. I was amazed by the results. With the S3 tires installed, the car received so much traction that it felt as if it was on the verge of traction rolling at all times. With the Yellow compound pre-assembled tires, the car was able to carry more speed through the corners without showing any signs of traction rolling. The car also felt smoother, faster and more drivable than

ever before—
simply amazing! I also



The Pro-Line Pre-Assembled Sedan Tires can lower your lap times by giving you more control of your car. The tires are

professionally assembled, which means they'll spin truer and will not expand or flex, even under extreme racing conditions. Just think: no gluing required!

noticed that the tires provide consistent performance from one pack to the other and that the tires have managed to stay bonded to the wheel even after more than a dozen runs. Overall, I'm very impressed with the Pro-Line 1/10-scale Pre-Assembled Standard Width Sedan Tires; I think you'll be impressed, too.

- Yellow (soft); part no. 2991, \$34.50.
- Green (medium); 2992, \$34.50.

—George M. Gonzalez

LRP

Micro Charger

A Good Thing in One very Small Package



Admit it. You looked at the picture and expected an ESC review; I know you did. Hey, don't feel bad. The new LRP* Micro Charger actually has an ESC case! This tiny unit will take a big chunk of weight out of your pit bag—guaranteed. More important, you can rely on the Micro Charger to put a solid peak on your packs. How does it work? Is it right for you? All will be explained!

One might expect such a tiny charger to be a "bare bones" unit, but it's surprisingly full-featured. For instance:

- It can peak-charge 6-, 7- and 8-cell packs.
- It will automatically go to trickle mode after peaking.
- It will shut down if a pack is taking too long to peak; this can prevent the pack and the charger from being damaged (the instructions aren't clear as to how long is too long, but I've yet to have a false peak with the LRP, so I'm not concerned about premature shutdown).

An internal 10A fuse protects the Micro Charger from any reverse-polarity or short-circuit mishaps, and it includes a spare fuse. If a fully charged pack is inadvertently connected to the unit, it will not overcharge it.

The Micro Charger couldn't be any easier to use. Two oversize spring clips connect it to a 12V power supply or an automotive battery, and the pack to be charged is plugged into the included

Tamiya connector. Although LRP says it's OK to swap the Tamiya connector for any brand you prefer, the instructions warn that you shouldn't shorten the unit's extra-long wires because the Micro Charger uses them as a heat sink and is designed to work with the resistance they provide. Once the pack has been plugged in, charging begins automatically. The Micro Charger's single LED flashes to indicate that the unit is operating and increases its flash rate as the pack nears a full charge. When the LED goes out, you know charging is complete.

The charge rate is fixed at 4 amps when charging 6-cell packs. This decreases to 2.2 amps when charging 7-cell packs and 0.8 amp for 8-cell packs. The low amperage makes charging 7- and 8-cell car packs tedious, but it is ideal for 600mAh transmitter batteries. At 4 amps, a 6-cell 2000mAh pack peaks in about 45 minutes.

We always have packs charging at *R/C Car Action*, and the LRP Micro Charger has been one of the hardest-working units in our workshop. The pocketable unit is also a favorite for photo shoots on location; if we run out of packs before we run out of film, we just charge our packs off the battery of the car that took us to the site. While the Micro Charger has worked well for us, a more telling endorsement comes from Associated's Mark Pavidis, who is frequently spotted with a Micro Charger on his pit table. Good enough for Mark; good enough for me! —Peter Vieira

Specifications

Part no.: LRP4101

List price: as we go to print, this hasn't yet been established, but Associated expects the list price to be between \$50 and \$60.

Suitable for: 6- 7- and 8-cell packs, 1200-4600mAh

Charge current: 4 amps (6 cells), 2.2 amps (7 cells), 0.8 amp (8 cells)

Power supply: external power source required—12 to 13.8 volts; minimum 5 amps

Additional features: LED charging indicator, delta peak-detection circuitry, internal fuse, 90-day warranty.

RPM

Motor Work Station Three Stands in One

How many motor stands do you have? I used to have three. The first was a double-clamp unit that I used to slave motors for break-in. The second was a single-clamp that I used for soldering capacitors and brushes. The third stand held the motor vertically so I could lube the endbell bearing without having the oil drip out.

I'm down to one motor stand now: RPM's* Motor Work Station. I haven't given up the utility I had with my three stands though; the RPM unit does it all. If I may shift into Ronco mode, I'll say that it's Three! Three! Three stands in one!

The Motor Work Station includes a base and two motor clamps. The clamps grip the motor via a thumb wheel, which is threaded through a brass insert to prevent stripping. The clamp openings are designed to allow a gap beneath the motor that allows motors with capacitors soldered to their cans to pass through the clamps. Another nice touch is the plastic's matte finish, which is nicer to handle and easier on the eyes than a shiny finish. The material is also impervious to motor spray, for obvious reasons.

As nice as these clamps are, it is the base that really pulls the product together. The clamps can be fit into the ends of the base, allowing two motors to be installed. This setup allows a slave motor to spin another's armature for no-voltage brush break-in. RPM includes a rubber coupling tube just for this purpose.

For regular maintenance, a single motor clamp can be installed in the center of the base. The wide base

The Work Station's base allows you to tighten the motor clamps while they are in the lay-down position



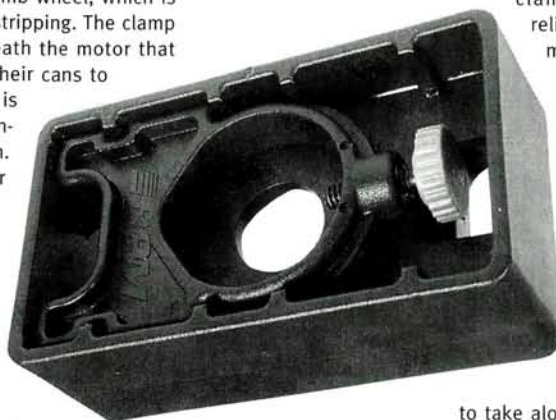
gives the clamp a big footprint for stability as you solder capacitors or perform other tasks. For jobs that require the motor to be held vertically, a motor clamp can be pressed flat into the base. A hole in the base allows

the motor shaft to pass through it, and the area where the clamp's thumb wheel sits is relieved, so the thumb wheel may be turned easily.

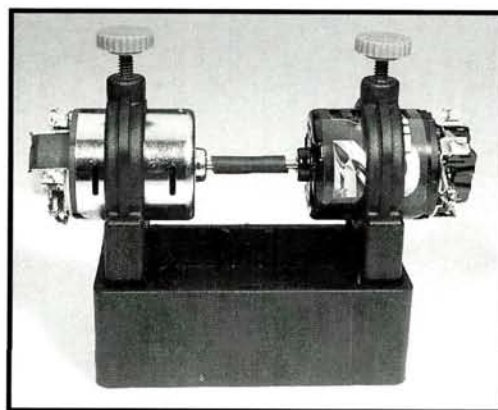
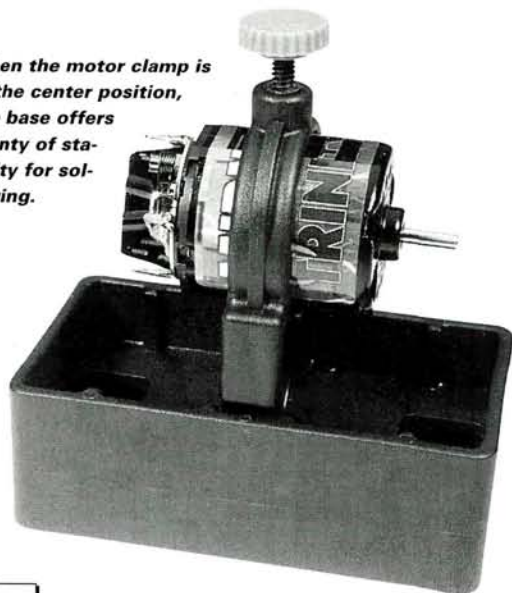
Although the Work Station is a pleasure to use, you might think it's difficult to fit into a cramped pit box. No problem; both clamps store flat in the base, leaving you with a package about the size of a juice box. The RPM Motor Work Station is just a good product, plain and simple. It's easy

to take along, it works like the precision tool that it is, and it should prove durable, given its construction and RPM's reputation.

—Peter Vieira



When the motor clamp is in the center position, the base offers plenty of stability for soldering.



With both motor clamps in place, the included coupling tube can be used to "slave" motors together for break-in.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201. ■

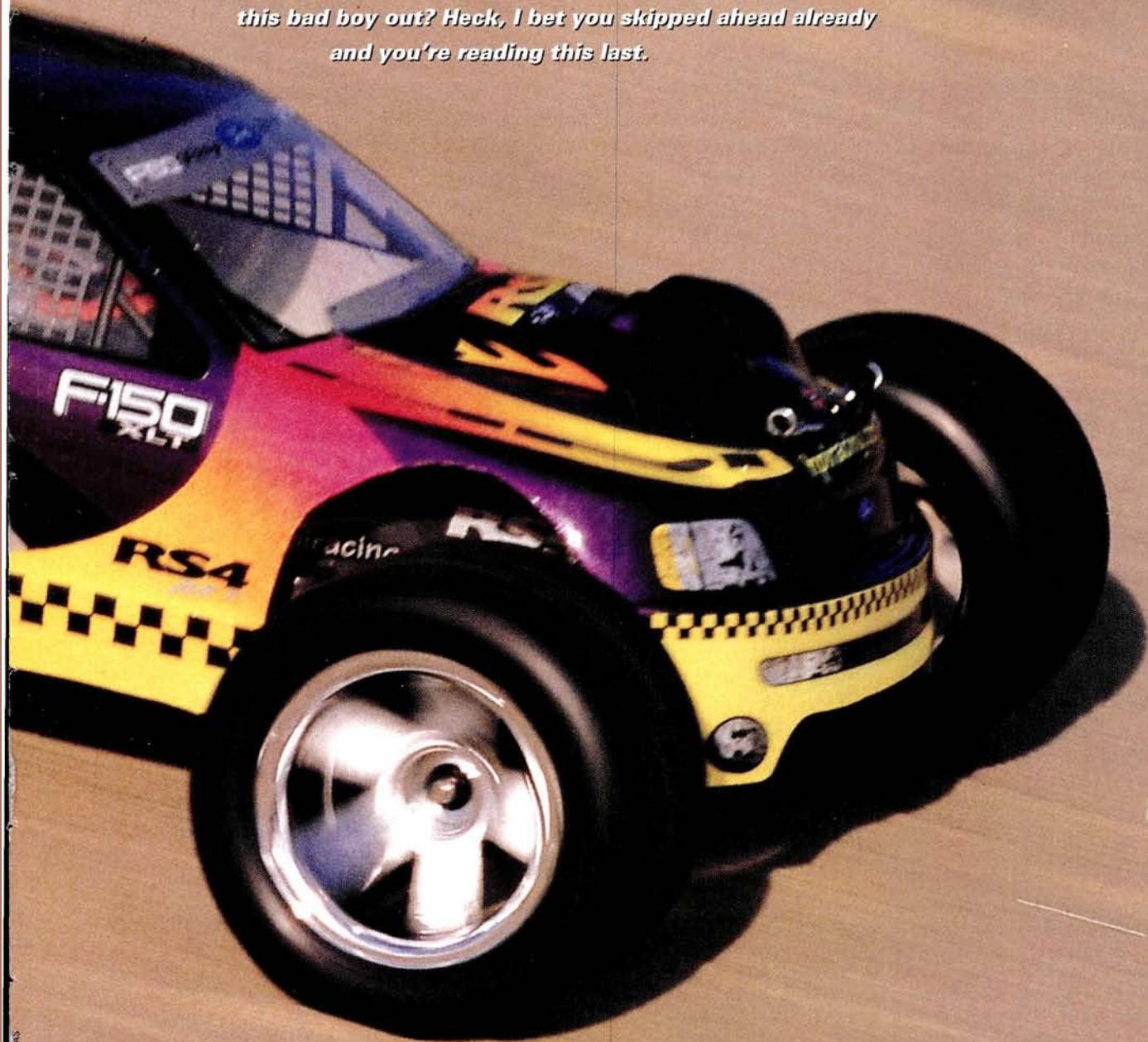
FIRST LOOK!



HPI by Peter Vieira
RS4 MT
Ultimate all-terrain machine

IT'S HERE! At last, HPI* has released the RS4 MT—a vehicle that has kept the R/C community waiting impatiently since the first prototype appeared in "Inside Scoop" over a year ago. Back then, the MT appeared to be little more than an RS4 with long suspension arms and long-travel shocks. The key word for the machine pictured in that "Scoop" is "prototype"; a lot has changed along the road from roughed-out concept to ready-for-the-world production machine.

The RS4 MT is a tour de force in foresight and clever design. This truck looks like the product of many "Wouldn't it be cool if ..." sessions. Are you ready to check this bad boy out? Heck, I bet you skipped ahead already and you're reading this last.



FIRST LOOK!



WHEEL OF FORTUNE

Chrome 5-spoke wheels are standard issue and are sized to accept all popular stadium-truck tires. HPI also offers foam truck tires for those who want to get crazy on the carpet.



HPI sent a built sample truck for us to get up close and personal with. The more you look at this thing, the cooler it gets! The pictures will help you to understand what the RS4MT is all about, but photos can't get across the quality and precision of this machine; it has the same race-ready feel as the RS4 Pro, in a stadium-truck package. The RS4MT should be able to conquer any terrain, and who knows?; this machine could launch a whole new competition class!



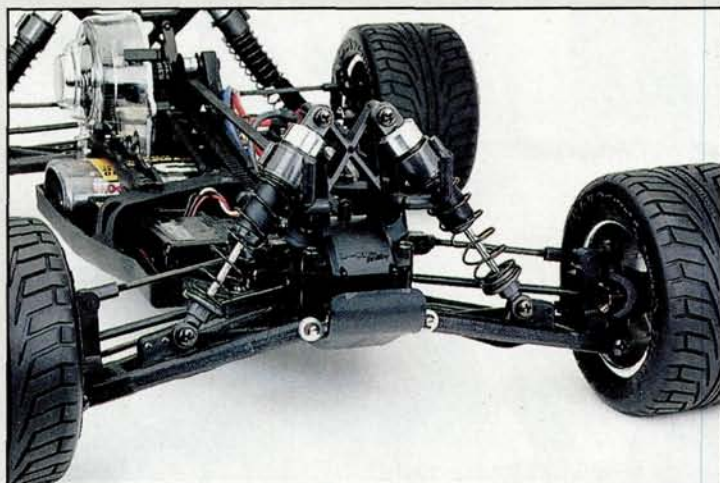
CLUTCH PERFORMANCE

The RS4 MT features a slipper clutch to help put the power down without unwanted wheelspin. The MT's box art shows all sorts of off-road action with the kit tires in place; the slipper will certainly help those smooth treads cope with the slippery stuff. The plastic tabs peeking over the motor plate secure a clip-on gear cover—a must for off-road running. Also visible in this shot are the "flying buttress" shock-tower supports.

CAUGHT IN THE MIDDLE

The RS4 MT's molded chassis is a first for HPI. Wide braces lend extra support to the shallow-tub design, and there's ample room for all the electronic goodies. The belt-tensioning pulley is visible above the motor; note the slot that allows fine adjustment.



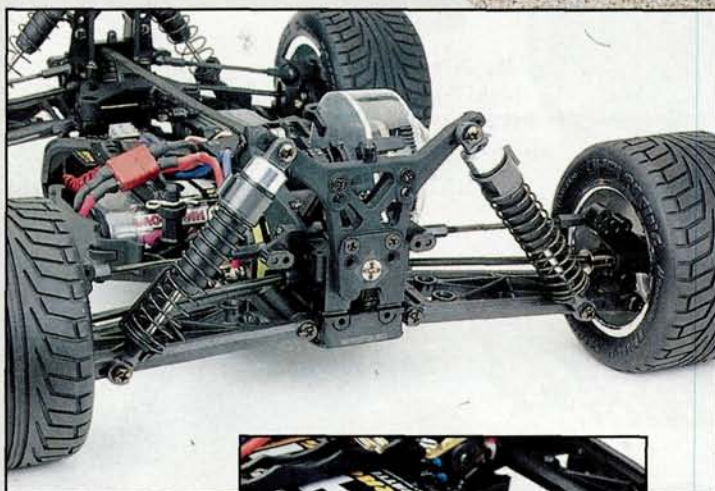


FRONT LOADED

I'm trying really hard not to use the old "tires like steamrollers" chestnut, but dang if those aren't some big meats! Note the drive shafts exiting the front bulkhead; don't forget, this is a 4WD system—something we're not used to seeing in a stadium truck. The dogbone drive shafts are connected to a gear differential, and that setup is duplicated in the rear of the car. The hubs and hub carriers are straight from the road-going RS4. The narrow, molded shock tower is heavily braced for stiffness, and bolt-on tabs are used to mount the long-travel shocks on the suspension arms.

THE SHELL GAME

Is this cool or what? The RS4 MT features a Lexan dirt shield to keep crud out of the dual-belt system. Rather than create a piece that was merely functional, HPI made the shield into a neat interior complete with driver figure. Wait ... hold on ... I'm sensing a Mike Ogle detailing article coming on! The little driver guy is perfectly placed to peer out from the snazzy Ford F-150 body, and HPI has included colorful decals for both inner and outer shells. A big, three-piece rear wing completes the body package and gives the RS4 MT an aggressive look (and a bunch of downforce).



BACK TALK

In addition to the many camber-link options available on the hubs, there are extra holes of note on the shock tower, and I don't mean the three shock-mounting positions. Look closely; the shock tower can be bolted on in the position shown here for off-road running, or the second set of holes can be used to raise the shock tower and thus lower the car for on-road use. The deeply angled shocks should also bolster the MT's on-road capability. If you squint, you'll see the shark-fin-shaped dirt shields that sprout off the suspension arms to deflect dirt and debris away from the shock shafts.

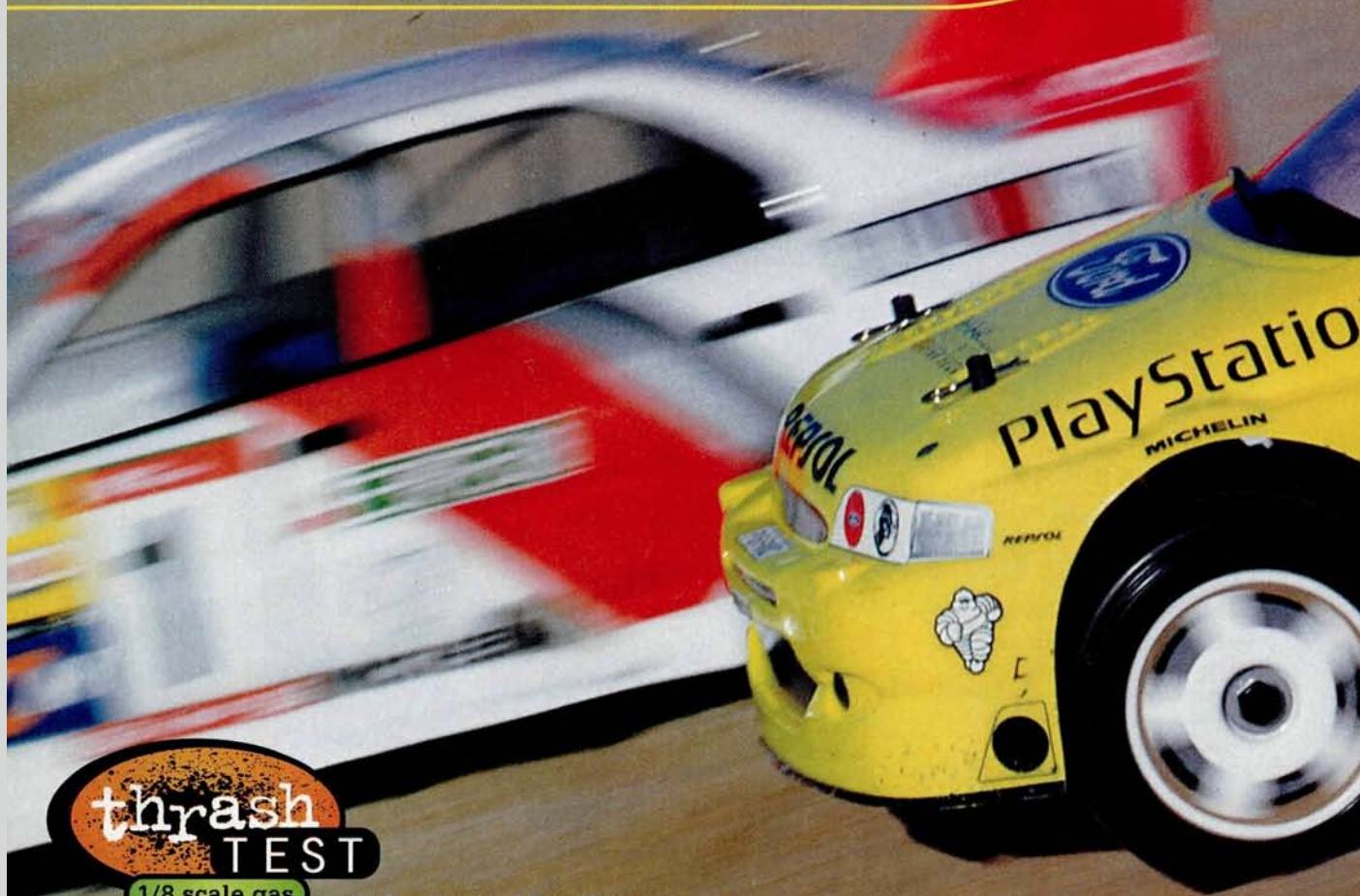
OPEN DOOR POLICY

A swing-away door allows stick-pack batteries to be installed and removed easily. Saddle packs can also be fitted by flipping over the brace above the battery. The scalloped side holds the cells tightly, while a single body clip secures each half of the saddle pack.



How does it run? Sorry, this is a "First Look," not a "Thrash Test," and our photo sample was not a runner. HPI has sent us a kit to test, however, and it's on the R/C Car Action workbench as I tap this into the ole Mac. If this thing is anywhere near as cool to drive as it is to look at, it should be killer! Look for the HPI RS4 MT "Thrash Test" soon.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.



thrash
TEST

1/8 scale gas

by Greg Vogel and Peter Vieira

Kyosho **GP Landmax 4WD**

YOU'VE GOT the wheel cranked hard to the left, and the rear wheels are coming around now; the car is sideways, keep your foot in it—countersteer, straighten; you're through the turn. Nothing but dust in the rearview mirror. Hammer down, through the trees; the local villagers part to let your turbocharged machine through. Suddenly, the ground drops away, and you're in free fall as you crest a small hill. The earth rises again to meet the tires, the supple suspension damps the blow and you hurtle on.

PHOTOS BY WALTER SODAS

FULL-BODIED 4WD FUN!



s p e c s

SCALE 1/8
LIST PRICE \$599.99

DIMENSIONS
Length overall 22.8 in.
Wheelbase 12.8 in.
Width (F/R) 9.8 in.

WEIGHT
Gross, RTR 7lb., 5.5oz.

CHASSIS
Type Stamped plate
Material Aluminum

DRIVE TRAIN
Type Shaft-driven 4WD
Primary Clutch bell/spur
Transmission Front and rear dogbones
Differential(s) 3 bevel gear diffs
Bearings/bushings Bearings and Oilite bushings

SUSPENSION (F/R)
Type 4W independent w/lower A-arms and adjustable upper link
Damping Oil-filled, coil-over shocks

WHEELS 2-piece, w/disk-brake insert

TIRES Rally pattern

POWERPLANT
Engine Kyosho GS21-R w/pull-start
Pipe Tuned muffler
Carb Slide

You're rally racing now—a mix of road-car hardware and off-road brutality that tests the limits of any four-wheel machine. Wouldn't it be great if you could do this with an R/C car—maybe a nitro-breathing, high-powered, 1/8-scale rally machine? The folks at Kyosho* are way ahead of you. Their new Landmax line represents a new breed of go-anywhere vehicles that can handle well on virtually any terrain. How do they do it? Read on

THE KIT

When you buy a new Kyosho Landmax vehicle, you start with an advantage: the chassis is largely pre-assembled. The front and rear bevel differentials, which feature ball-bearing-supported outdrives, have already been built and installed in their respective gear cases. The center differential with 51-tooth nylon spur gear also spins on ball bearings. Two plastic brake disks are mounted on either side of the center diff and are actuated by push/pull cams.

Front and rear brake bias is easily adjustable. The drive-train components are bolted to a nicely finished, silver aluminum chassis that is very similar to that of the Inferno (pre-MP5)—a well-proven design. The steering bellcranks are also pre-assembled, requiring only final installation on the chassis. The parts are connected with adjustable threaded tie rods. Kyosho scores a few style points by including blue-anodized braces for the steering system, suspension pivots, center diff and dirt shields that should help keep the chassis free of debris.



No cluttered chassis here! Large dirt shields help keep the chassis free of debris. Engine, pipe, manifold, cooling fan, 125cc fuel tank, oil-filled shocks and drive train bearings are included.

YOU'LL NEED

- 2-channel radio w/2 servos, receiver, dry-cell holder
- Fuel
- Fuel bottle (optional)
- Glow-starter
- Tools for assembly
- Paint for Lexan
- 12 AA batteries
- Loctite

FACTORY OPTIONS

- 2-speed assembly—part no. GT-30.
- Universal swingshaft (narrow)—GTW-1.
- Special tie rod (narrow)—GTW-2.
- Special upper rod (narrow)—GTW-3.
- Stabilizer set—BS-63.
- Big pressure shocks (front)—BSW-27.
- Big pressure shocks (rear)—BSW-28.
- Special disk plate—BSW-52.
- Front shock stay—BSW-53.
- Special radio post—BSW-54.
- Front one-way unit—BSW-82.
- Special unicrank—BSW-86.
- 8x16mm ball bearing—BS-16.
- Special clutch shoe—KC-45.
- Fuel filter—1876.
- Colored silicone tube—1790.
- Front bumper—GT-17.
- Urethane foam bumper—39401.
- Dual muffler set—GT-2.

BUILDING & SETUP TIPS

One advantage of buying a Kyosho product is that many K-cars are sold partially assembled. In this case, the center portion and differentials of the Landmax cars have already been built, and each car's engine has been installed. These components can be a little tricky to assemble, especially when you're new to the sport. Kyosho did leave some building challenges for you; namely, the shocks and suspension arms. Don't worry, the excellent instruction manual guides you through the building steps. Here are some suggestions.

■ Thread-lock, thread-lock, thread-lock. It is very important to use the stuff on an 1/8-scale car. Do yourself a big favor and buy a tube when you get the car. The extreme vibration from the engine can loosen and damage parts. To help protect your vehicle, put a drop of medium-grade Loctite wherever a machine screw goes into another metal object.

■ Step 6 suggests that you cut a plastic tab off the hub carrier so it won't interfere with the wheel. Make sure you cut off the correct tab.

■ When CA gluing the fan pieces together, make sure the fan blades face in the proper direction (study the pictures carefully). Once glued, they're there for life.

■ Use some RCPS* Green Slime lubricant on the shocks and O-rings. Since the O-rings are already installed in the shock bodies, I used a small Allen wrench to transfer the grease to the rings.

■ When you put the shocks on the car, the suspension will probably sag too much. Add pre-loads clips to the shocks to raise ride height. You want the suspension to sag just a little for down-travel.

■ When the car has been completely assembled, double-check the camber, toe-in and toe-out. Set all of these adjustments at zero and run the car. After your test runs, play with the adjustments if you feel you need to improve the handling of the car.

■ Follow the instructions for the engine to the letter. Correct operation increases an engine's longevity and maximizes performance. Before storing your engine, apply a couple of drops of Hobbico's* After Run oil to prevent any residue from gumming it up.

LET'S RACE!

Anytime you have two R/C vehicles up and running, there will be some racing; our photo shoot of the Landmax vehicles was no exception. Once we finished taking photos, the grudge matches began!

We all agreed that a dedicated class for these rally machines would be a great idea for any club, and we're already working on Chris Marcy to get something going up at R/C Madness in Enfield, CT—Chris's shop and the unofficial "home track" of R/C Car Action. Since the Landmax cars include a strong, reliable engine and factory pipe, they would be naturals for a "spec-" type class; everyone would have the same horsepower, and racers would be required to run kit tires. To exploit the capabilities of the Landmax machines, we envisioned a course that would include a loop on the paved parking lot as well as segments of off-road track. We think it could really take off; the cars are fun, easy to run and represent a good value. What do you think? Write or email us (addresses are on the "Letters" page). Until then, we'll see you at the track!



IMPRESSIONS

CHRIS

I predict that the new Landmax will define a new class of racing. It's a rugged, run-it-anyway-you-like machine based on a time-proven 1/8-scale chassis and drive train. But wait! It's also a scale machine that's equally at home on old cracked concrete and muddy back lots.

Think about it: your racecourse can wind its way along the pavement, go off-road and end up back on the blacktop again. The possibilities for new heights of exciting racing—fun and serious—are limitless! I hope other companies and aftermarket manufacturers will see the potential and jump with all fours onto the bandwagon. This, we need more of—much more! Thanks, Kyosho!

PETE

Every once in a while, a car comes along that makes even the most jaded, been-there, driven-that R/C buff stand up and take notice. With the introduction of the new Landmax vehicles, Kyosho has created that car.

For the first time, we have a car that's truly "all-terrain"—including pavement. Sure, anything can roll along on the hard stuff, but the Landmax cars actually handle. It's like driving an electric sedan, only faster, louder and more exciting! You can really feel the mass of the big 1/8-scale platform as the car transitions from turn to turn, and there's plenty of suspension to keep it composed.



cars on your workbench.

The car has scale handling to match its scale looks; it's just a ton of fun to drive. It gets even better when you go off-road, as this car will four-wheel-drift through turns like a sprint car and take the rough stuff like the rally machine that it is. When the Landmax is bounding down a trail, chugging out dirt, with its wheels bobbing up and down in the fender wells, you just can't help but be impressed. It's that kind of R/C experience. Add Kyosho's quality and reliability to the mix, and you have a go-anywhere machine that just might mothball some of the other

GEORGE

Kyosho's new 1/8-scale Landmax nitro-powered rally cars are downright rude! These things are big, fast, loud and, thanks to their race-proven shaft-driven 4WD systems, capable of bullying their way around any terrain. They are based on Kyosho's new Inferno DX II chassis, so you know they'll be able to withstand a beating. The cars also arrive 60 percent pre-assembled, so you'll soon be out carving trails instead of sorting through parts bags.

I had a chance to pilot one of the cars during a photo shoot at a beach in Connecticut. Although I wouldn't recommend that you run these cars (or any other cars) in sand, I've got to tell you, we had a blast. Assistant editor Greg Vogel and I had both cars running at the same time, and we started playing follow the leader. Of course, I led while Greg followed (Greg's probably stewing right about now).

There was so much sand flying around that it took a week to get it all out of my hair. In fact, I think Chris Chianelli still has sand in his (among other things).

The cars performed beautifully. They had plenty of steering and

plenty of rear bite, and the power generated by Kyosho's new GS21-R engine was very impressive. Run one tank of fuel through a Landmax and you'll agree—these cars are all about excitement!

GREG

Believe me, I made all sorts of speculations about the cars before they even hit the ground. First, their appearance caught my attention. They look cool and are really big!—rally bodies, rims and tires bolted onto an Inferno/Espirit-based chassis and new .21 recoil engines. I was genuinely impressed with Kyosho's potent package. I also speculated that because they're narrow and capable of ballistic speeds, they would spend a lot of time on their roofs. Kyosho proved me wrong.

"Fast and fun" doesn't even begin to describe these cars. We ran them at a local beach; I yanked the throttle, lit up all four tires and shot off along the sand—indescribable power! You haven't seen a rooster tail until you've seen a Landmax pass by!

Then the G-Man and I went head to head. We rubbed fenders and tapped the back of each other's cars until we had worn a deep, track-like groove in the sand. I ran the Escort with the budget electronics setup. It fared well against the Hitec electronics setup, but the G-Man's car steered with noticeable authority.

The final verdict? These cars have massive amounts of traction, mounds of steering and gobs of power. As you can probably tell from our action photos, these scale models look outrageous and perform with pizzazz. With the new Landmax rally cars, you can run on any surface, but what's really cool is they're 1/8 scale and nitro powered, so they have the extra kick that makes running even more exciting.



KYOSHO GP LANDMAX 4WD



Here's a close-up of Kyosho's GS21-R with pull-start. It's another addition to Kyosho's line of reliable engines. The heat sink is anodized blue, and the carburetor is a slide type. In front of the engine are the large air filter and cooling fan powered by means of a pulley that extends from the end of the crankshaft.



Here's more evidence of a well-built car: nylon and composite parts and steel dog-bones. All I can say is "Solid!" "What's this?" You say the shock tower looks as if it was made of flimsy plastic. No; it's composite and, although it does flex, it doesn't break.



Inferno or Esprit? The answer is: both. Components from both cars are used on the Landmax cars. Narrow, rigid suspension, aluminum shock tower, oil-filled shocks and all-terrain tires—all essentials of a well-built rally car.

Mitsubishi
Lancer Evolution



Ford Escort
RS Repsol

THE INSTALLED ENGINE

Also installed is the new Kyosho .21 engine with recoil starter. Kyosho has expanded its line of durable, inexpensive, entry-level engines with the GS21-R. It features a solid aluminum crankcase with precise porting, ABC piston and sleeve, slide carburetor (with low and high mixture controls) and cool blue-anodized head. The kit comes with a manifold and tuned muffler—components one must usually purchase separately. The included air filter features a thick sponge element and a plastic cover for wet-weather racing. A 125cc fuel tank stores enough fuel for long runs, and the attached rubber primer bulb helps fill the feed line and prime the engine.

These rally cars can really heat up the engine during thrash sessions, so an engine-cooling fan unit is included. The engine keeps the fan spinning by means of an O-ring "belt," driven via a pair of pulleys linked to the clutch nut. When gluing the fan assembly together, make sure the blades face the proper direction or you'll be cooling off the gas tank instead of the engine!

SUSPENSION

The Landmax's suspension arms are borrowed from Kyosho's GP20 on-road Esprit kit. The short (by 1/8-scale buggy standards) lower arms give the Landmax machines a scale-looking stance, and each arm features setscrews to limit suspension travel. The upper link is adjustable, and several pivot locations allow the car to be tuned to different conditions.

The kit comes with stout knuckle arms and Oilite bushings for the axles to ride on. The knuckle arms are housed in rigid uprights lifted from the Inferno; they must be trimmed to accommodate the smaller-diameter rims used by the rally platform. A full set of coil-over, oil-filled shocks comes with the kit and is molded in a blue composite that goes well with the car's blue heat sink head and blue-anodized chassis braces.

RADIO GEAR AND INSTALLATION

All the electronic gear required to operate the Landmax machines fits on a single tray that can easily be removed to facilitate

Likes

- 60% pre-assembled
- Fast .21 engine with recoil starter
- Durable
- Scale appearance
- Can be used on many surfaces

- Axles ride on bushings

dislikes

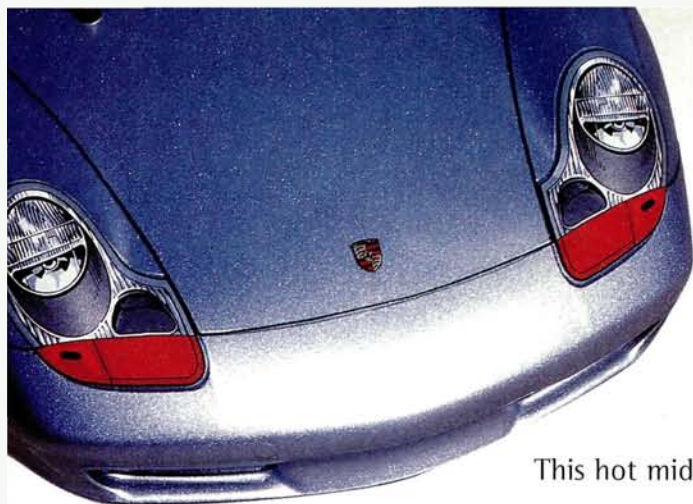
cleaning and maintenance. The electronic equipment is bolted onto the tray first, then the tray is bolted onto the chassis.

We equipped our Lancer Landmax with Hitec* servos to maintain powerful control. A 615-MG handled the steering, a 605BB took care of the throttle, and the signals came from a Futaba* 3PJ radio system. For the Escort Landmax we chose Futaba gear including the Futaba Sport radio and receiver, a 3001 servo for the steering and a 3003 for the throttle. Although high-speed/high-torque servos are the usual choice for vehicles of this size, the expense of an 1/8-scale kit leaves many hobbyists with little dough for high-zoot servos. We wanted to see how the entry-level gear would fare. Kyosho provides a pink rubber cover to shield the receiver from any electronics-harming debris.

FINISHING TOUCHES

Both Landmax vehicles included colorful, authentic decals and molded accessories to replicate each machine's respective full-size counterpart. The Lancer was finished faithfully, but we went to the bright side of the spectrum with the Escort (it was Chianelli's idea: "Hey, it's your model; you can paint it any color you wish.") Rally-pattern rims with faux brake disks make the car look more authentic. The firm, rally-tread tires are capable of grabbing traction in various terrain. A Kydex rear bumper also doubles as a carrying handle, handy when wrestling a big 1/8-scale vehicle out to the track.

* Addresses are listed alphabetically in the Index of Manufacturers on page 201.



Tamiya's finely printed decal sheet really brings the body to life; static-model realism and remote control make for a fun package.

WEISS

THE ENGINEERS at Germany's Weissach center should be commended for their remarkable efforts on the '97 Boxster.

This hot mid-motor roadster has already been awarded high honors from the motoring press, and its popularity can be confirmed by numerous top-down Boxster sightings on warm, sunny days—at least in the ritzier parts of town. Even if a trip to the Porsche dealer is beyond your budget, you can still put a Boxster in your garage—in 1/10 scale. Tamiya's* replica duplicates the original's athletic look right down to its directional rims. While the Porsche salesman might not let me slip behind the wheel for a spin, I'm more than ready to test-drive the Tamiya version!



Tamiya Porsche Boxster

by Kevin Meyer



PHOTOS BY KEVIN MEYER

ACH WONDER

THE KIT

The Boxster is built around Tamiya's popular M chassis—in this case, an M02L. The 02 indicates rear drive, and the "L" designation makes the Boxster a long-wheelbase car by virtue of an extended front bulkhead. All the familiar M-chassis features are in place; let's take a closer look.

TRANSMISSION

The sealed gearbox holds some really massive gears, so if you follow the assembly instructions, you should have a very dependable tranny! The beveled

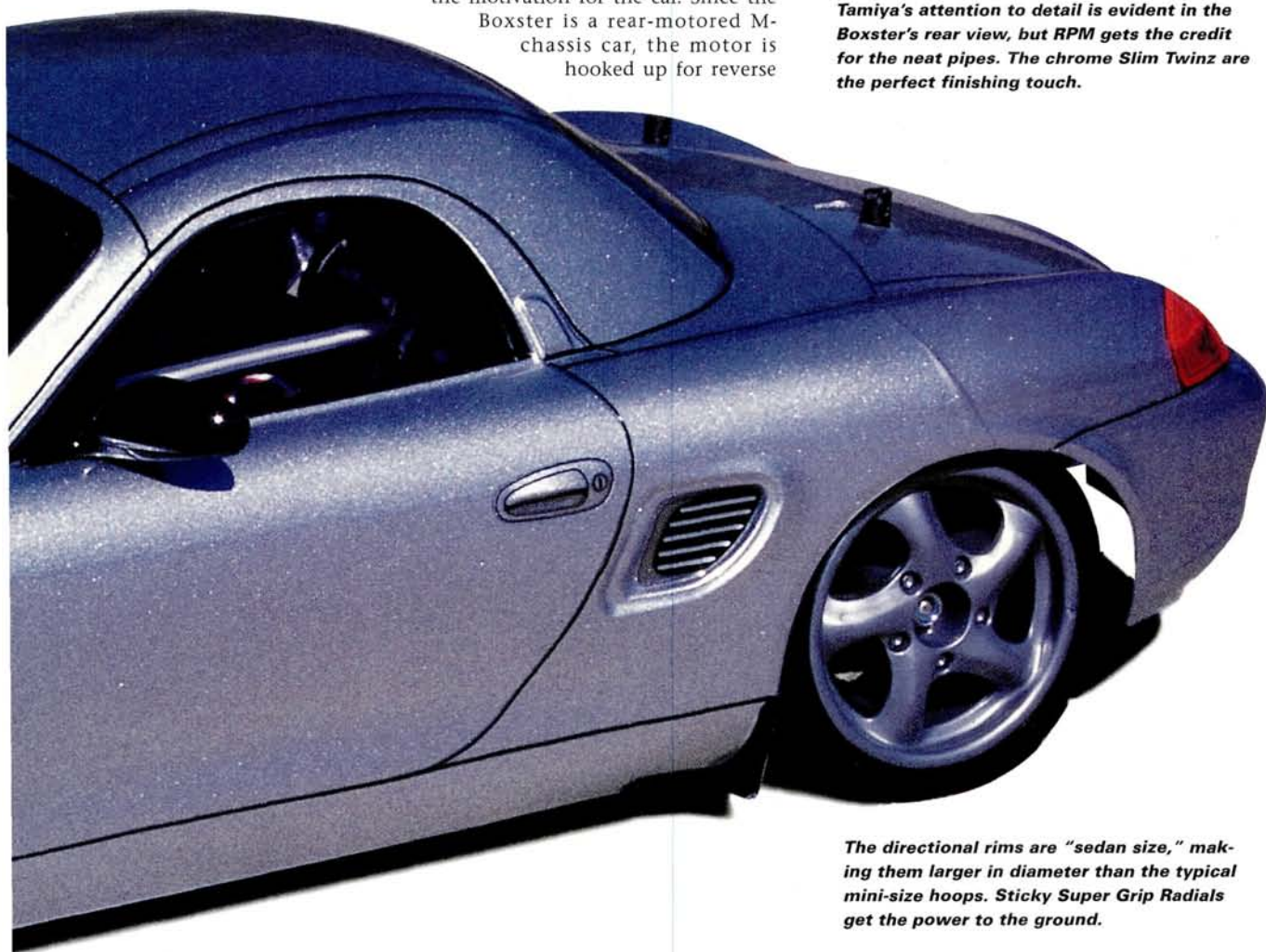
gear diff is effective and smooth—one of the smoothest I've built. All gears spin on steel shafts and plastic bushings. Bearings are included for use on both ends of the idler gear and on the inside of the spur gear. Nicely plated outdrives exit either side of the tranny case and turn dogbone-type drive shafts.

Three predrilled motor-mounting holes allow you to choose from 16-, 18- or 20-tooth gears. Just pop on a new pinion, and select the correct motor-mount hole; the gear mesh is preset to make gear changes fast and easy. An included 540 motor provides the motivation for the car. Since the

Boxster is a rear-motored M-chassis car, the motor is hooked up for reverse



Tamiya's attention to detail is evident in the Boxster's rear view, but RPM gets the credit for the neat pipes. The chrome Slim Twinz are the perfect finishing touch.



The directional rims are "sedan size," making them larger in diameter than the typical mini-size hoops. Sticky Super Grip Radials get the power to the ground.

TAMIYA PORSCHE BOXSTER

rotation. Go-fasters can upgrade the car with any of the reverse-rotation stock motors available, or if you plan to install a mod motor, rotate the endbell to reverse polarity.

SUSPENSION

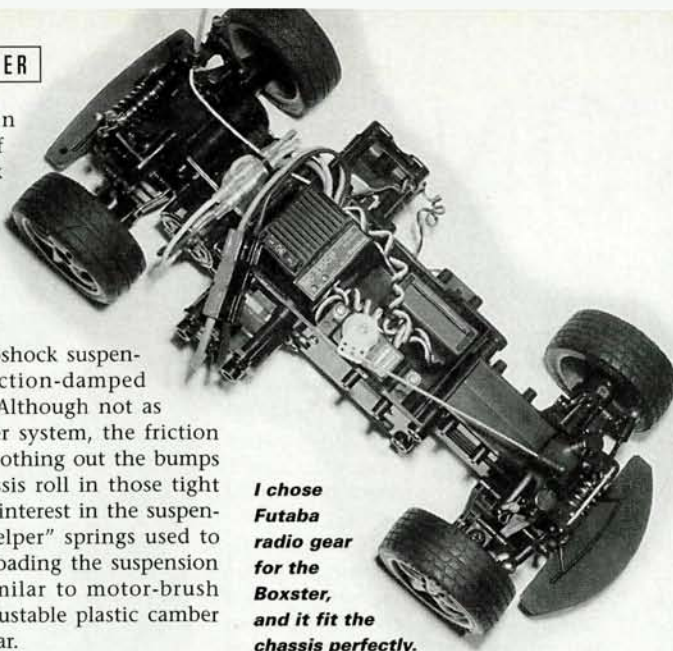
The Boxster features a monoshock suspension at both ends with friction-damped shocks to smooth the ride. Although not as plush as an oil-filled damper system, the friction shocks do a good job of smoothing out the bumps and helping to stabilize chassis roll in those tight corners. The other points of interest in the suspension department are the "helper" springs used to resist chassis roll by spring-loading the suspension arms. These springs are similar to motor-brush springs, only larger. Non-adjustable plastic camber links are in place front and rear.

CHASSIS

The plastic chassis is neatly divided into three sections: the front steering assembly, the center tub (which houses the electronics) and the rear-mounted transmission assembly. Each section is assembled in halves to form a tough structure when joined. A preformed tunnel through the chassis only accepts stick packs, unless you want to do some major modification to the battery holder. Molded end plates keep the pack centered, and the right side plate is removable for quick and easy pack changes. Front and rear mini bumpers protect the suspension parts but don't project beyond the body shell. Although this preserves the car's scale appearance, it does little to protect the body in a crash.

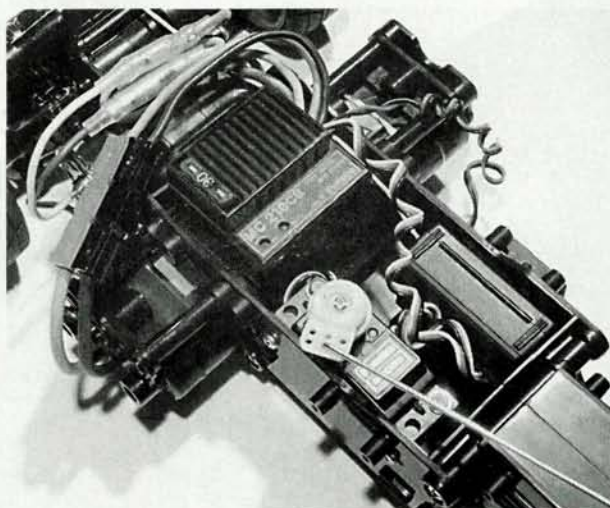
TIRES/WHEELS

This Porsche rolls on "full-size" sedan rims rather than the smaller mini-style rims and tires. The taller tires make for a higher final drive ratio, and that means faster top speeds—cool! The true-to-scale rims sport very sticky radial-style rubber. Two tread



I chose Futaba radio gear for the Boxster, and it fit the chassis perfectly. The MC210CB

reversing ESC is attached to the wide sills that support the battery pack, while the receiver is laid on its side to make the most of the narrow chassis space.



YOU'LL NEED

- 2-channel radio system with two servos (or one servo and an ESC).
- 6-cell stick pack.
- Battery charger.
- Paint for polycarbonate body.
- CA glue to secure tires to rims.

tires are fully seated, be sure to use high-quality CA to glue them to the rims.

■ For super damping action on the shocks, fill the shock bodies with thick automotive axle grease. The grease lasts forever and won't leak out.

■ When it's time to paint and detail, be sure to trim those decals closely. This makes application easier, especially the window molding that's applied in sections. Clean, smooth cuts will make the trim work look much more realistic.

s p e c s

SCALE 1/10
LIST PRICE \$220

DIMENSIONS
Length overall 15.5 in.
Wheelbase 95/8 in.
Width (F/R) 6.5 in.

CHASSIS
Type Plastic tub modular design
Material ABS plastic

DRIVE TRAIN
Type Sealed
Primary Pinion/spur
Transmission Dogbone/axles
Differential Beveled gear diff
Bearings/bushings Bushings (bearings used on idler gear)

SUSPENSION (F/R)
Type Independent horizontal friction shocks
Damping Non-oil-filled, coil-over shocks with cantilever helper springs

WHEELS (F/R)
Type 5-spoke directional

TIRES
Front Racing radial
Rear Super grip radial

ELECTRICS
Motor 540 Johnson reverse rotation
Speed control 3-step mechanical w/reverse
Battery Not included

FACTORY OPTIONS

- 18T, 19T AV pinion gear set—part no. 50355.
- Hi-torque servo saver—50473.
- M-chassis drive shaft and cup set—50632.
- Pin-type wheel adapter—53056.
- Manta Ray ball diff set—53070.
- Low-friction aluminum damper set—53155.
- Aluminum kingpins—53157.
- M-chassis universal shaft set—53205.
- M-chassis ball bearing set—53206.
- Touring car super slicks—53220.
- Touring car M2 slicks—53224.
- Touring car M2 radials—53227.
- M-chassis 4x65mm aluminum screw set (5 pcs.)—53234.
- M-chassis stainless steel suspension shaft set—53235.
- M-chassis hollow carbon gear shafts—53237.
- M-chassis front and rear stabilizer set—53239.
- M-chassis aluminum motor heat sink—53241.
- M-chassis aluminum racing steering set—53253.

BUILDING & SETUP TIPS

This model is simple to build yet complex in its workings. At a leisurely pace, building the kit will take 4 to 5 hours; but don't worry about racing against the clock (at least not yet, anyway). Before getting started, look over the manual and make sure you have all the correct tools to do the job.

■ When trimming pieces off the parts tree, use a sharp hobby knife or diagonal cutters and trim closely. This will save you the trouble of trimming or sanding later, and the parts will fit together better, too.

■ To get the most out of your tires, take a minute to make certain the wheels don't run wobbly or lopsided. Once the

materials are used to enhance traction and steering performance; standard Racing Radials are mounted up front, and stickier Super Grip radials grace the rear wheels. Foam tire inserts accompany the rims and rubber.

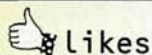
BODY

This is certainly the most outstanding feature of the kit. Tamiya has pulled off an excellent rendition of Porsche's '97 Boxster. Check out how the body wraps around the chassis; this kind of bodywork can't be achieved with the conventional vacuum-form procedure. Tamiya uses special multi-piece molds to get every detail, shape and form just right. This method does have its drawbacks, as there are visible seams left by the forms. These tend to

The car is a fun ride, it's above par in the scale-looks department, and it's easy to build and maintain.

detract from the realism of the body but are hardly noticeable once the shell has been painted.

The body follows Tamiya's typically high standards. The shell is covered with



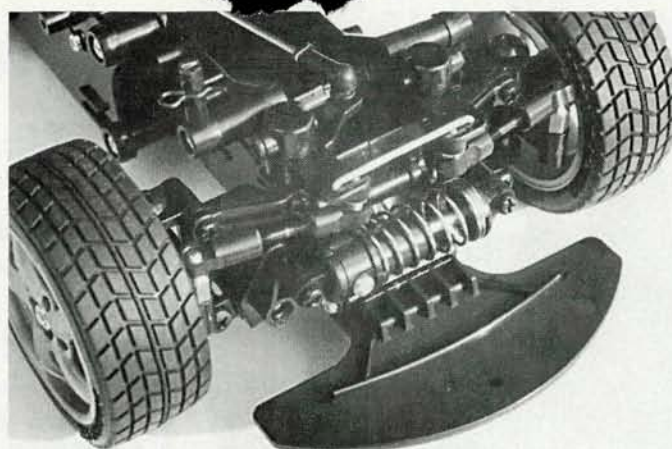
Likes

- Quick, easy and fun to build.
- Total scale realism.
- Thorough and well-illustrated instruction manual.
- Excellent construction.
- New tire combination improves handling.
- Many optional goodies.

- Accepts only stick packs.
- Steering system could be tighter.
- Friction shocks.



dislikes



The steering bellcranks are hung over the friction-damped front monoshock and feature adjustable threaded links. The treaded radials are well suited to parking-lot running.

a protective film to prevent overspray mishaps, and body-mount holes are predrilled—really helpful for beginners. As always, window mask is standard equipment. A modest but precise decal sheet features headlights, taillights, window moldings, air scoops and a very authentic Porsche nameplate. I just had to add the finishing touch of a Slim Twinz, chrome, dual tailpipe from RPM*. The pipe is a perfect fit for the flared lower rear panel of the Boxster. It really completes the rear view of this model.

TEST GEAR

With parking-lot fun in mind, I aimed for an affordable radio system that would upgrade the mechanical speed control (MSC) to an electronic speed control (ESC)—a recommendation I would make

to any beginner. Installing an ESC will eliminate many frustrations and definitely make your first R/C model experience more enjoyable. The Futaba* radio package I purchased includes the Magnum Junior transmitter, MC210B ESC, R122JE receiver and an S3003 servo. The MC210B ESC is a reliable performer with proportional forward brakes and reverse. Its replaceable 30A fuse protects the electronic innards from being fried and

allows the use of mild modified motors. The S3003 servo was a great pick for handling the steering duties. This is an excellent budget system and the perfect choice for this model.

PERFORMANCE

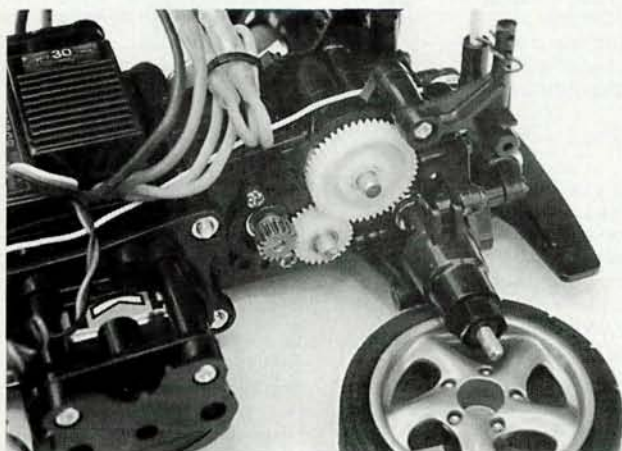
Running the Boxster reminded me of my early days in R/C when I had more fun setting up an obstacle course and racing against the clock than I did racing against other cars. At the end of the course, I'd throw the car into reverse and go backwards through the obstacles. Talk about honing hand/eye coordination! I found myself doing this again with the Boxster and its reversing ESC, and I discovered the car's crisp handling only added to the fun. I found that the new tires made a big improvement in the handling of the car. Right out of the box, the car cornered very well—even under full throttle. The tire combination seemed to help curb understeer and prevent the rear end from breaking loose under hard acceleration.

I enjoyed run times of over 8 minutes with the included 16-tooth pinion gear and kit motor. Top speed wasn't ballistic, but with an aftermarket reverse-rotation stock motor and an 18- or 20-tooth pinion, speeds could pick up considerably.

FINAL THOUGHTS

I'm sure some R/C hobbyists will buy this kit just because it's a Porsche, but the Boxster is a fine car on other levels as well. This package has everything to please the first-timer: the car is a fun ride, it's above par in the scale-looks department, and it's easy to build and maintain. With a few choice hop-up items, you could be competitive against similar vehicles in the parking-lot arena. Hmmm ... I wonder whether I could talk the local Porsche dealer into swapping test drives with me for an afternoon?

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.



With the gear cover removed, we get a good look at the beefy drive gears. Three motor-mount holes provide gearing options, and preset gear mesh is a bonus.



World champions

tip

performance



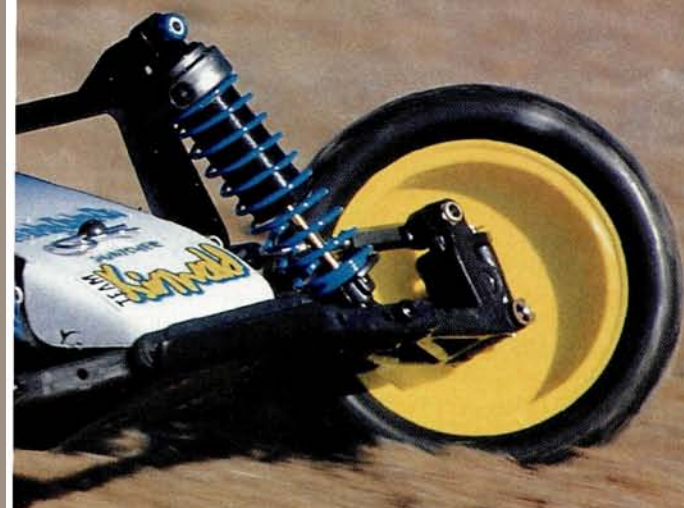
PHOTOS BY WALTER SIDAS



Team Losi XX 'CR' KINWALD EDITION

by George M. Gonzales

IN CELEBRATION OF Team Losi*/Team Trinity* factory driver Brian Kinwald's recent victory at the '97-'98 IFMAR World Championships, Team Losi has released the limited-production Double-X 'CR' Kinwald Edition. The Kinwald 'CR' includes many of the factory and aftermarket tuning parts that Brian used to capture the 2WD world championship, as well as a few exclusive parts available only in this kit. The best part is that the kit is available at an incredibly low price, which means you can now own a piece of R/C racing history without having to dig too deeply into your piggy bank. By now, most off-road racers should be very familiar with the Double-X 'CR' as well as with Brian Kinwald's success with Team Losi racing products. Let's focus on the buggy's unique features.



own!
e you can



TEAM LOSI XX-'CR'

s p e c s

SCALE 1/10
LIST PRICE \$399.95

DMENSIONS

Length overall 15 in.
Wheelbase 10.625 in.
Width (F/R) 9.625/9.875 in.

WEIGHT

Gross, RTR 3 lb., 7.5 oz.

CHASSIS

Type 3-piece modular
"G-tunnel"
Material Graphite composite

DRIVE TRAIN

Type Sealed gearbox
(2.19:1 reduction)
Primary Pinion/spur
Transmission MIP Constant Velocity
Drives (CVDs)
Differential(s) Adjustable ball
Slipper clutch Dual-disk friction
slipper
Bearings/bushings Sealed bearings

SUSPENSION (F/R)

Type Independent A-arm
w/upper camber link
Damping Oil-filled, hard-
anodized shocks

WHEELS (F/R)

Type 1-piece plastic
w/Lexan dirt shield
Dimensions (DxW) 2.1 x 0.75 in. (F);
2.2 x 1.625 in. (R)

TIRES

Front Losi Wide Body
(Silver compound)
Rear Losi X-2000
(Silver compound)

POWERPLANT

Motor, battery, ESC Not included

YOU'LL NEED

- 2-channel AM or FM radio system with one servo.
- 6- or 7-cell battery pack.
- Battery charger.
- ESC.
- Motor.
- Pinion gear.
- Lexan-compatible paint for the body.
- CA glue for the tires.

FACTORY OPTIONS

- 2-degree rear pivot block—part no. A-2113.
- 1-degree 'CR' rear hub carriers—A-9806.
- Graphite-composite rear pivot plate—A-9830.
- Aluminum hard-coated suspension balls—A-9940.

KIT FEATURES

• **Graphite.** "Everywhere you look there's graphite!" was my initial thought as I opened the nicely presented Kinwald 'CR' box. All the chassis pieces, battery strap, front and rear suspension arms and rear shock tower are molded from Team Losi's light and rigid graphite composite material. The graphite pieces reduce the weight of the car by nearly 2 ounces while adding rigidity to the chassis and suspension. The rear 3-degree toe-in pivot blocks, 0-degree hub carriers and front 25-degree steering and caster blocks are also standard issue on the Kinwald 'CR.'

• **Kingpin ball studs.** You have probably noticed that many of the Team Losi factory drivers replace the front kingpins, which retain the front steering blocks, with special kingpin balls. On most tracks, Brian prefers to use the standard camber-rod location, but the optional kingpin balls come in handy on extremely high-bite tracks, or when the steering response feels too "snappy." Keep in mind, however, that if you choose to install the optional kingpin balls, you'll have to grind off the ball-joint mounting holes on the caster blocks to accommodate the kingpin balls. Once the conversion has been completed, you cannot return to the stock camber-rod location unless you buy new caster blocks.

• **Ball-bearing steering.** The Double-X 'CR' includes one of the slickest steering bell-crank/servo-saver systems in the business. The Kinwald 'CR' goes a step further by adding ball bearings to the bellcranks for even smoother performance.

• **New front shock tower.** The Kinwald 'CR' includes a special fiberglass front shock tower that's smaller and slightly lighter than the stock 'CR' shock tower. Basically, the outside shock mounting and outside camber-link holes have been omitted because they're rarely used. The result is a smaller, more esthetically pleasing shock tower that retains the original suspension geometry.

NOW HOW MUCH WOULD YOU PAY?

Since the Kinwald Edition 'CR' costs only about \$50 more than the standard-issue kit, you might expect to get about 50 bones' worth of hop-ups. Guess again! Bought separately, the long list of included goodies easily surpasses 50 bucks when you do the math. I can see why this kit is a limited edition!

TEAM LOSI OPTIONAL PARTS

- Graphite chassis, chassis brace, battery strap, rear shock tower, front and rear suspension arms.
- Aluminum top gear shaft.
- New dual-disk slipper-clutch assembly.
- Titanium-nitride shock shafts (complete set).
- Ball-bearing steering.
- Kingpin ball studs.
- X-cellerator racing body.
- Blue-anodized wing buttons.
- Silver compound X-2000 rear tires (with foam inserts).
- Silver Compound Wide Body front tires (with foam inserts).
- Kinwald Edition front shock tower.
- Kinwald Edition decal sheet.

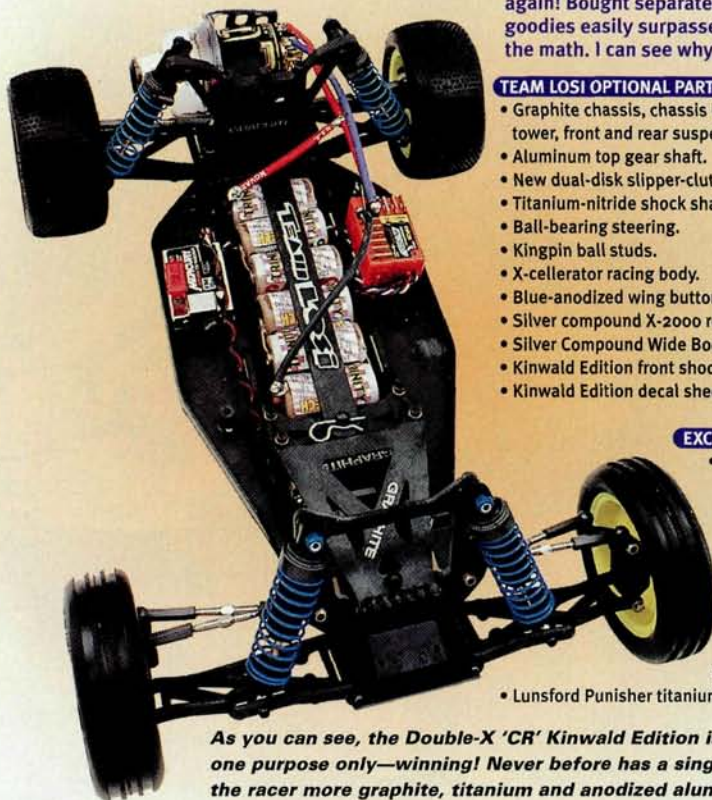
EXCLUSIVE KINWALD EDITION PARTS

- Blue-anodized motor plate.
- Blue-anodized aluminum nuts.
- Blue-colored pink rear springs.
- Tuning tips from Brian Kinwald.

NON-LOSI HOP-UPS

- MIP Constant Velocity Drive (CVD) drive shafts.
- Lunsford Punisher titanium tie rods (complete set).

As you can see, the Double-X 'CR' Kinwald Edition is built for one purpose only—winning! Never before has a single kit given the racer more graphite, titanium and anodized aluminum.

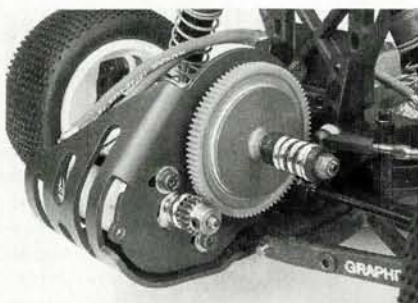


BUILDING & SETUP TIPS

• **Tranny upgrades.** The Kinwald 'CR' comes equipped with the dual-disk slipper-clutch setup adapted from the Double-X 4 that Brian used to capture the world championship. The unit is considerably lighter than the Hydra Drive-equipped slipper-clutch setup, and that alone is a major benefit. Brian actually prefers the dual-disk slipper clutch to the Hydra Drive on all but extremely bumpy tracks. The dual-disk slipper offers a broader range of adjustment, resulting in smoother throttle control both off the line and out of the corners. Also standard on the Kinwald 'CR' is Losi's optional lightweight aluminum top shaft, which takes a bite out of rotating weight. But wait; there's more. You couldn't have a Kinwald replica car without MIP Constant Velocity Drives (CVDs). Losi threw in a set because Brian swears by them.

• **Hot shoes.** The Kinwald 'CR' comes equipped with top-of-the-line racing rubber: Losi's X-2000 rear tires in Silver compound stick like glue to hard-packed, blue-groove tracks. The Wide Body fronts, also in the Silver compound, work great just about anywhere. The front and rear tires come with foam inserts. I was very surprised to find that the Kinwald 'CR' does not include Losi's newer 5-spoke wheels as featured on the standard 'CR.' Instead, the original wheels with Lexan dirt shields are used. When I asked Gil Losi Jr. why the 5-spoke wheels were not included, he replied; "Brian always uses the original style wheels, and we want the Kinwald Edition 'CR' to be a faithful representation."

• **Anodized goodies.** Like Brian's personal car, the Kinwald 'CR' is graced with a subtle touch of blue-anodized hardware. All the visible locknuts are blue-anodized



Here's a close-up of the dual-disk slipper clutch. The dual-disk slipper may be set looser than a single-disk slipper clutch and will still provide ample friction to engage the transmission. The kit does not include the Hydra Drive traction-control system, but you'll find that the dual-disk slipper clutch provides smooth, consistent throttle control. The Hydra Drive is still used by all the Team Losi drivers on extremely rough tracks.

The folks at Team Losi designed a special manual for the Double-X 'CR' Kinwald Edition that takes into consideration all of the car's unique features. The instructions are truly first-rate and could be used as a benchmark for all R/C instruction manuals. It includes step-by-step instructions, CAD illustrations and parts-identification charts. A small helmet is pictured on each step and is always facing the front of the car to give the builder a point of reference. The instructions also include a final checklist to go through before you operate the vehicle for the first time. In the section titled "Brian's Setup Tips and Hints," Brian Kinwald explains the car's various adjustments and their effect on performance.

As with all pro-level R/C vehicles, some R/C experience is required to successfully build and race this car. First-time racers should seek the advice of more seasoned R/C builders on some of the car's crucial assembly steps. The excellent instructions guide you through the building process, rather than simply providing the usual do's and don'ts. I'll pass the pen over to Brian Kinwald, so he can show you how to set up your ride for two completely different tracks.

BUMPY, SLIPPERY TRACK

Ride height (F/R)	Level
Battery position	Middle
Springs (F/R)	Green/pink
Internal travel limiters (F/R)	0.090/0.090
External travel limiters (F/R)	B-spacer (rear only)
Shock oil (F/R)	30/30
Shock pistons (F/R)	57/56 or 55
Front toe-in/out	0 degrees
Rear toe-in/anti-squat	0 degrees
Front caster angle	25 degrees
Camber (F/R)	2 degrees/2 degrees
Rear hub spacer position	Middle
Kingpin ball studs	Optional
Optional Hydra Drive	Yes

SMOOTH, HIGH-BITE TRACK

Ride height (F/R)	Level
Battery position	Middle
Springs (F/R)	Blue/red
Internal travel limiters (F/R)	0.120/0.120
External travel limiters (F/R)	None/B-spacer
Shock oil (F/R)	30/30
Shock pistons (F/R)	57/56
Front toe-in/out	0 degrees
Rear toe-in/anti-squat	2 degrees
Front caster angle	25 degrees
Camber (F/R)	2 degrees/2 degrees
Rear hub spacer position	Middle
Kingpin ball studs	Optional
Optional Hydra Drive	No

■ Camber-rod locations (inside and out)

FrontMiddle hole on shock tower/kingpin ball on caster block
Rear.....Position 6 on rear bulkhead/position "A" on rear hub carrier

■ Shock-mounting positions (top/bottom)

Front.....Middle hole on shock tower/middle hole on suspension arm
Rear.....Second hole in on shock tower/outer hole on suspension arm

■ Camber-rod locations (inside and out)

FrontOuter hole on shock tower/position "B" on caster block
RearPosition 6 on bulkhead/position "B" on hub carrier

■ Shock-mounting position (top/bottom)

FrontOuter hole on shock tower/middle hole on suspension arm
RearSecond hole in on shock tower/outer hole on suspension arm

as are the wing buttons and motor plate. In keeping with the blue theme, the Kinwald 'CR' includes "secret" blue rear shock springs that are actually pink springs in disguise—no doubt, a great way to throw off your competition. The front shocks also have blue springs, but these are actual 2-inch 3.8-rate blue front springs. The motor plate and "secret" blue rear springs are only available in this kit and cannot be purchased separately.

• **Other cool features.** Also included is a complete set of Team Losi titanium-nitride shock shafts, an X-cellerator buggy body, a complete set of Lunsford Punisher titanium tie rods, a special Kinwald Edition decal sheet and tuning tips from world champion Brian Kinwald. Yes, this kit has it all!

TEST GEAR

- Airtronics* CX2P radio system.
- Airtronics 94157 steering servo.
- Novak* Cyclone ESC.
- Novak Mercury 27 MHz FM receiver.



Novak electronics and Trinity power—always a hot combo.

- Trinity EX-Tec Sanyo RC 2000 matched cells.
- Trinity D3 12-turn, double-modified motor.

PERFORMANCE

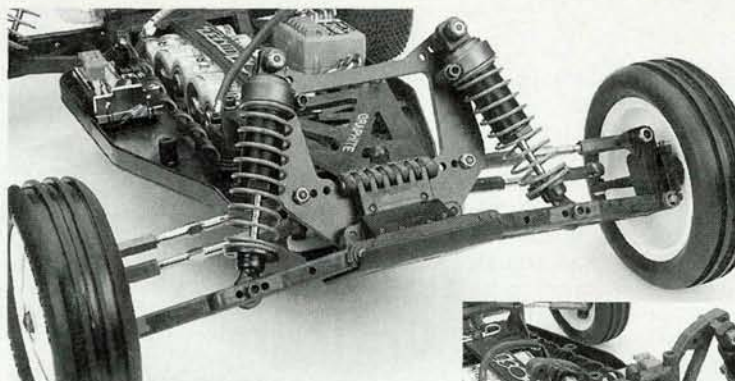
I decided to give our new Kinwald 'CR' a little shakedown by entering it in a club race at California's So Cal Raceway. The new facility features two completely separate indoor tracks. As soon as you walk through the front doors, you'll see a large, blue-groove, off-road track that

TEAM LOSI XX-'CR'

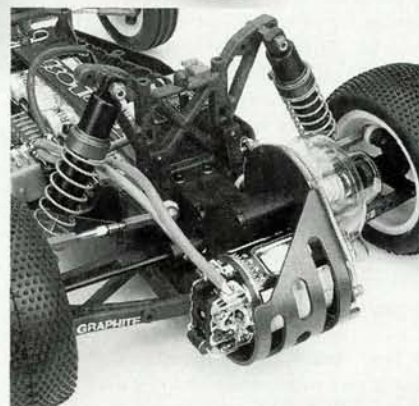
practically takes your breath away. Toward the rear of the building there's a tight, asphalt-banked, oval track with an intricate infield that's used for roadcourse and touring-car racing. The pro shop is well stocked with all the necessary items, and it also carries many special tuning parts made by local manufacturers. In short, So Cal Raceway is a first-class establishment and an exciting place to race.

As usual, I showed up late and soon discovered that I had missed the first qualifier altogether and that the second round of qualifying had already started. This meant I had to set up my pit area, charge up some batteries and get the car ready to race in less than 30 minutes. Fortunately, I had spent ample time at my workbench the night before, checking the car's ride height and front and rear alignment. I also set up the car according to Brian Kinwald's setup recommendations as outlined in the instructions, so I was fairly confident that the car would track straight and jump squarely.

The announcer called my number and the Kinwald 'CR' was off and running. After taking the first series of corners and two sets of double jumps, I arrived at a couple of conclusions. First, the car was dialed and, second, I was racing against a



Above: graphite suspension arms, Wide Body tires, Lunsford titanium tie rods and Blue 3.8-rate springs are all standard equipment on the Kinwald 'CR.' The kit also includes the special Kinwald front shock tower that's smaller and more esthetically pleasing. **Right:** in the rear, you'll find the graphite rear shock tower and suspension arms. Lunsford titanium tie rods, MIP CVDs, and Losi X-2000 tires are also included. Love that blue-anodized aluminum motor mount!



👍 Likes

- Excellent performance.
- Outstanding value.
- All the graphite and titanium goodies are in the box.
- Lots of cool blue-anodized aluminum hardware and fasteners.
- Kit includes some custom parts that are available only in this limited-production kit.
- Very cool "Kinwald" decals.
- Awesome body.
- Excellent instructions with special tuning tips from world champion Brian Kinwald.
- Ready to win the A-main right out of the box.

• I still can't beat Kinwald!



dislikes

very talented and courteous group of drivers. The Kinwald 'CR' felt light and incredibly responsive. The X-2000 rear and Wide Body front tires provided plenty of traction on both the damp and dry sections of the track. The consistent traction allowed me to focus on obstacles (and other traffic) rather than try to remember the slippery sections of the track. In fact, the car was so hooked up it carried most of its straightaway speed through the large sweeper, and I was able to toss the car around the sharper corners without breaking the rear tires free completely. Although the track was relatively smooth, the car handled the strategically

placed bumps and jumps with agility and flew across the large tabletop jump like a stealth fighter.

After the second qualifier, I was pleased to find that I had finished on the same lap and only 6 seconds off the TQ pace. I decided to install the optional kingpin ball studs as recommended in the instructions. According to Kinwald's setup tips, the kingpin ball studs are useful on high-bite, blue-groove-type tracks. I also made a couple of adjustments to the Novak Cyclone ESC with the Pit Wizard handheld programmer. I increased the drive frequency from 5.86KHz to 15.6KHz and increased the brake frequency from 3.90KHz to 5.86KHz. These are drastic changes, but I was curious to find out how the car would handle.

During the third qualifier, I immediately noticed the effect of the adjustments that I had made to the Cyclone ESC. I had to pull on the trigger a little more to reach top speed, and I had to push it more to reach full brakes. The car felt smoother and more controlled on the fast sections of the track, but it took on a subtle and less aggressive demeanor in the corners. This would have been the perfect setup for a slippery track, but didn't work well on the surface at So Cal. As a result, I ended up one lap slower than in the previous qualifier. Fortunately, my good run in the second qualifier placed me in the A-main, but I qualified fifth, which stuck me smack-dab in the middle of the grid.

Before the main, I reprogrammed the Cyclone ESC to a lower drive frequency. I settled on a drive frequency of 11.7KHz, but left the brake frequency unchanged. The start of the A-main could have been a little cleaner. Gridlock set in as the cars at the rear of the pack formed a sandwich

with the cars from the front of the pack. My car ended up being the meat of choice for this particular sandwich, and it was tossed, punted and used for traction by all of the other cars. So much for courteous driving! By the time the turn marshal retrieved my buried car, I was dead last. After the crummy start, I decided to just take it easy and try to get a feel for the car. I did notice that it felt more responsive and had regained some of its aggressiveness in the corners, but it still had a subtle feel, which I grew very comfortable with. Before I knew it, I had passed a cluster of cars and was back where I started—in fifth place. I held my ground throughout the rest of the race, but ended up losing another position on the very last corner. I finished sixth in the A-main and felt that was cause for celebration.

FINAL THOUGHTS

Overall, I'm very pleased with the performance of the Team Losi Double-X 'CR' Kinwald Edition. It's light, fast, responsive and very trick looking. Add the kit's graphite parts, titanium turnbuckles, CVDs, anodized-aluminum hardware and a host of exclusive "Kinwald" parts, and you have the makings of a winner. With a suggested retail price that's only 50 bucks more than a stock 'CR,' there's no doubt in my mind that Team Losi will sell out of these kits quickly. If you're thinking of upgrading your current R/C equipment, or if you're new to the hobby and would like to start off-road racing with a high-quality, high-performance R/C product, drop what you're doing and get over to your hobby shop in a hurry. These babies won't last.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201. ■



OFNA Z10 Pro by Greg Vogel

YOU HAVE TO GIVE credit to OFNA* for putting competitive, well-equipped cars within the reach of those of us with limited budgets. Many of us got into 1/8-scale buggy racing because of OFNA's HODR and its Ultra GT spinoffs, which brought the cost of the big gas machines to a new low while performance remained high. It looks as though OFNA is up to its old tricks again, but this time it's the electric-sedan segment that's receiving OFNA's more-bang-for-the-buck touch. The new Z10 Pro is a fully equipped, graphite, all-bearing, "whoa Nellie" chassis kit that looks like a winner.

CARBON-FIBER STREET FIGHTER

s p e c s

SCALE 1/10
LIST PRICE \$379.95

DIMENSIONS
Length 13.75 in.
Wheelbase 10.15 in.
Width 7.48 in.

WEIGHT
Gross (RTR) 3 lb., 2.5 oz.

CHASSIS
Type Rigid lower and upper plate
Material Graphite

DRIVE TRAIN
Type Belt
Primary Pinion/spur
Transmission Universals
Differential(s) Ball type
Slipper Clutch None
Bearings/bushings Sealed ball bearings

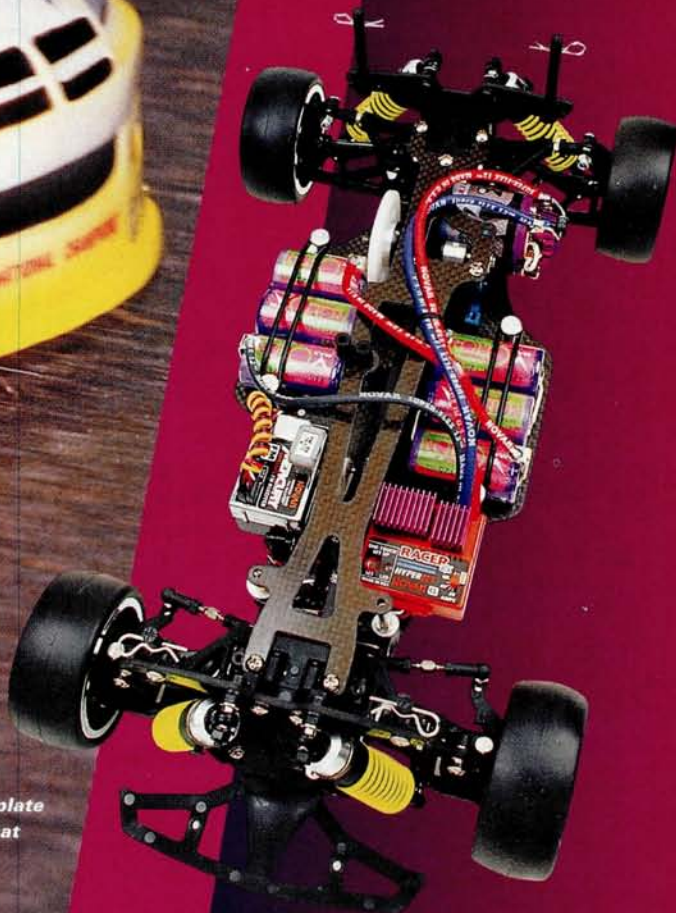
SUSPENSION (F/R)
Type Lower suspension arm w/turnbuckle upper link
Damping Oil filled, coil-over shocks

WHEELS (F/R) One-piece spoke

TIRES (F/R) Sedan slicks

MOTOR Not included

Gobs of graphite make the Z10 Pro a pretty car. The stock ball diffs, full ball-bearing set, universals and machined-aluminum motor plate let the competition know that this sedan means business.



BUMPING UP THE PERFORMANCE

Tim Bump, driver for Team OFNA, piloted the Z10 (not the Pro) to the TQ position and a win at the '97 NORRCA Sedan Nats in the expert stock class. With a little persuasion, he agreed to give up his Z10 setup secrets. Tim has occupied many podium positions with this successful setup. Try it out! Even if it doesn't suit your particular driving style, it will be an excellent starting point for further adjustments.

FRONT SUSPENSION

Ride height: 1/4 in.
Camber: -1 degree
Roll bar: none
Toe-in/out: 1 degree out
Location of steering ball link on knuckle arm: forward for more steering; aft for less steering.

FRONT SHOCKS

Oil: 30WT
Piston: small, 2-hole
Spring: yellow
Limiters: none (use the down stops to adjust the clearance; adjust so that the chassis is 1/2 inch off the ground when the tires pick up; front and rear).

REAR SUSPENSION

Ride height: 1/4 in.
Camber: 2 degrees
Roll bar: none
Location of upper camber link on the hub: top

REAR SHOCKS

Oil: 30WT
Piston: large, 2-hole
Spring: blue
Limiters: same as front
Lower arm shock position: outer

TIRES (F/R)

HPI Super Slick Pro Compound (non-belted), or Speed Max TN 022.

OTHER

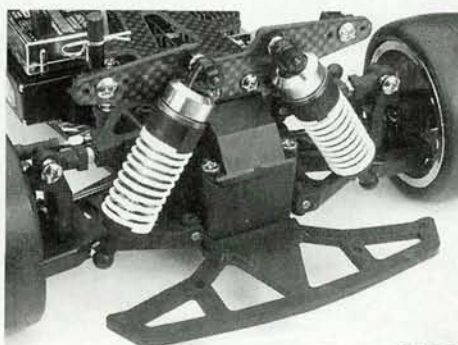
Andy's Stratus body



THE KIT

• **Chassis.** One of the best-looking—and -performing—materials for a chassis is graphite, or more accurately, woven carbon fiber. The Z10 Pro makes ample use of the stuff; both chassis plates and shock towers are cut from the space-age material. The lower plate is slotted to accept saddle-pack batteries and places the cells close to the center of the car to minimize chassis roll. The front and rear of the chassis have rectangular cutouts beneath each diff to release any pebbles or debris that may make their way into this delicate area. Although the narrow chassis layout has its performance advantages, there is limited space to mount the electronics. The receiver needs to be mounted on top of the steering servo, and the speedo hangs off the chassis more than another chassis might require. For extra security, I invested a little more time to roughen the chassis surface for better tape adhesion when I installed the ESC. You may want to try one of the new micro-size speedos to better fit the Z10 Pro's tight quarters.

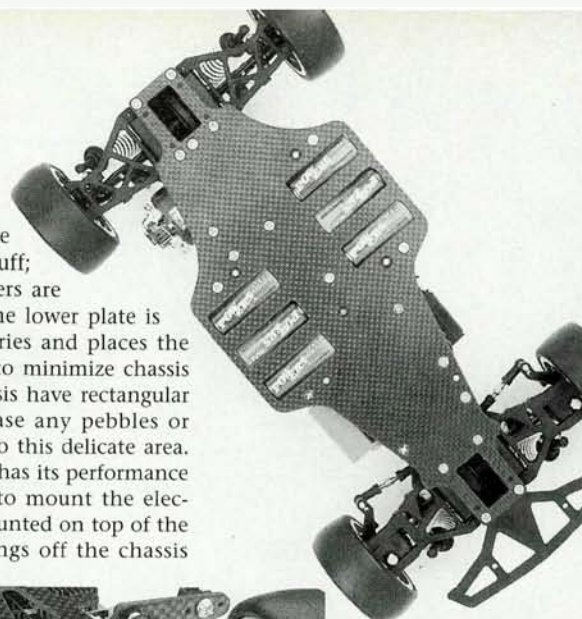
• **Drive train.** It is commonly accepted that any would-be racing sedan must have dual-belt drive. The Z10 Pro is no exception, but be advised that the Pro's belts tend to be fairly tight when new. After a few packs have been run



Above: up front, two large-volume shocks damp the car. Rigid suspension components and adjustable links scream performance. Right: a closer look at the placement of the steering knuckle and upright shows their offset in comparison to the arm. The arm has been extended to maximum length to improve handling. Also notice the universal axle—stock equipment for the front and rear ends.



This is the chassis' underside. Note the rectangular slots meant to let out any debris that gets caught in the front and rear bulkheads.



YOU'LL NEED

- 2-channel radio.
- ESC.
- Steering servo.
- Battery and charger.
- Motor.
- Body and paint.
- CA for the tires.

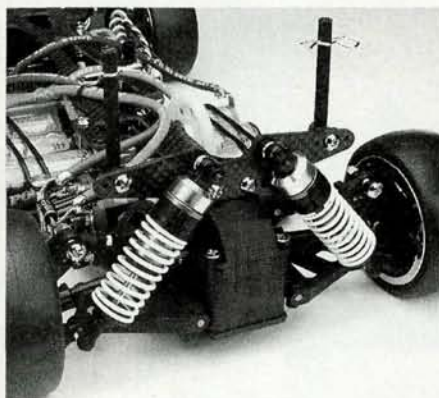
FACTORY OPTIONS

- Shock shaft, short type—part no. 37051.
- 22T pinion gear—37902.
- 23T pinion gear—37903.
- Stabilizer set—37910.
- Hex drives, aluminum, 5.5mm (blue)—37916; 7.5mm (red)—37917.
- Spring set—37918.
- Springs, yellow and red—37913.
- Saddle pack quick-change strap—37919.
- Aluminum motor cooling fins—37912.
- Delrin diff halves—37927.
- Diff cap joints—37141.
- Kingpin, bushing and screws—37221.
- Front one-way pulley—37901.
- Aluminum CNC knuckles—37922.
- Aluminum CNC "C" hubs—37923.
- Aluminum CNC rear uprights—37924.
- Aluminum CNC front lower arms—37925.
- Aluminum CNC rear lower arms—37926.
- Street tires, 1" width—85103.
- Street tires, 1.25" width—85104.
- Wheels, Star 2mm—85805.
- Wheels, Star rear—85806.
- Full line of tires and wheels.

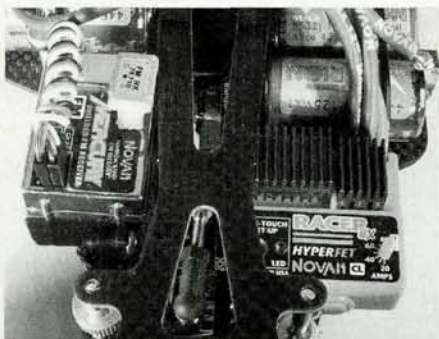
BUILDING & SETUP TIPS

If you want your Z10 Pro to perform properly, you must follow the kit instructions closely. Take the time to go over the directions before you start tossing parts bags around. Here are a few tips to keep in mind while you are building:

- When building the shocks, use a little RCPS* Green Slime on the O-rings for the best seal and least "stiction." Trial-fit the pistons in the shock bodies before assembly, as the edges may need to be lightly sanded to achieve a smooth fit. Also, remember to put a 5mm spacer on the front shock shafts before you install them in the bodies.
- Take care not to overtighten the nut that holds the spur gear and its mount; it can cause the drive train to bind.
- Before attaching anything to the graphite parts, sand their edges to reduce the chances of splintering. It's also a good idea to file the long edges of the battery slots on top of the chassis. This will allow the battery to sit a little lower on the chassis, will help to keep the battery in the slots and will remove any sharp edges that might cut through the batteries' shrink-wrap.
- If the front belt feels too tight, remove the tensioner. If the belt is still tighter than necessary, use an old motor with a 4-cell pack to run the car on a stand; this will allow the belt to break in without straining your good equipment.



The rear of the car features a graphite shock tower and large, plush shocks. The body posts are set far apart to reduce body jittering.



Above: the layout of the electronics looks tight, but it keeps the batteries and electronic gear close to the chassis' center. The Novak receiver and speedo, along with a quick Hitec servo, provide pro-caliber control. Below: an 11x3 Peak Performance motor was selected for its prodigious power. Notice the aluminum layshaft support. This blue-anodized gem isn't a hop-up; it's a stock part on the Z10 Pro.



through, the belts will break in nicely and shouldn't stretch much thereafter. The kit includes a front-belt tensioner, although the tensioner is not required out of the box.

The drive belts are configured like those on other popular dual-belt sedans: a spur-driven layshaft holds two pulleys—one for each differential. The layshaft rides on ball bearings set into a precisely machined aluminum support that also incorporates a motor plate. The blue-anodized motor plate has been drilled out to lighten the part as well as to provide more cooling surface area. The belts drive dual ball differentials, which are smooth, light and ball-bearing supported—true race equipment. Universal axles complete the drive train and use hex hubs to fit the many aftermarket touring-car rims.

• **Suspension.** The front and rear suspensions feature lower A-arms with ride-height adjusting setscrews and adjustable upper arms. The hinge pins are held in by setscrews—no more E-clips to pop off the car into oblivion. The front arms are linked to "C" carriers, which hold the knuckle arms with heavy-duty kingpins. I replaced the steel kit tie rods with Lunsford* titanium units that I had lying around; there's nothing wrong with the kit pieces, but any chance I get to install Lunsfords, I install 'em.

The extremely rigid suspension components have little flex. Less flex makes for more responsive handling, although there have been some reports of brittle parts breaking in cold weather. OFNA's Dave Morales has a good-faith replacement program for anyone who has experienced breakage problems; if you have, and you purchased a Z10 Pro between October of '97 and April of '98, call OFNA, tell them when you purchased your Z10 Pro, and they will send you upgraded nylon suspension components absolutely free. This offer is good only until the end of April, so act now! Current production kits already include the revised parts; they may also be ordered as aftermarket replacements. My Z10 Pro has shrugged off its share of hits, but I'm glad to know OFNA stands behind its cars.

The shocks on the Z10 Pro appear to be a little large and look as if they would be at

likes

- Lots of graphite.
- Aluminum motor plate.
- Drives great.
- Nice price.

dislikes

- Shock pistons need to be sanded.
- Stock tire compound is too hard for competitive racing.

home on an off-road car, but they work well. Extra pistons and spring preload clips are supplied in the kit. I found that the pistons' outer edges needed to be sanded slightly to allow them to slide smoothly within the shock body. The steering assembly is a typical bellcrank system with a built-in servo saver that is easily adjusted via a thumb wheel. Once again, I installed Lunsford turnbuckles for the steering links.

TEST GEAR

To finish the Z10 Pro, I used a Hitec* HS225BB for the steering and Novak's* Racer EX and Mercury receiver for power delivery and signal reception.

I dropped in a Peak Performance* EBX 11x3 motor and an Orion* matched 6-cell pack for go power, while my faithful JR Propo* R-756 radio kept me in touch with the car. I'm looking forward to upgrading to the new R-1 soon, but the 756 is still a more than capable radio. Andy's* supplied a new Dodge Stratus body, with custom paint from Andy himself. To help extend the life of the show-quality body, I installed the kit-supplied foam bumper. I also opted for shiny Invader rims by RPM* and replaced the hard kit tires with sticky Pro-Line* S3 slicks.

ON THE TRACK

I visited a nice, clean parking lot where I could push the Z10 Pro to the max. The Z10 Pro laid down the power, accelerating rapidly without any wheelspin. Some credit has to be given to the Peak Performance motor, the Novak speedo and the sticky Pro-Line tires, but the efficient drive train and smooth differentials were equally essential to efficient power transfer. The car's quick response to power is just one of its great attributes; another would be its handling.

(Continued on page 167.)

COMPETITION

THE	HPI RS4 Pro	Roadrunner XPress	Kyosho TF-3	Schumacher SST 2000	Tamiya TA03F-Pro	OFNA Z10 Pro	Tenth Technology Predator DTM
Wheelbase	10 in.	10.25 in.	10.3 in.	10 in.	10.1 in.	10.15 in.	10 in.
Width (F/R)	7.25/7.125 in.	7.25 in.	7.75 in.	7.125 in.	7.19 in.	7.48 in.	7.25 in.
Weight	2 lb., 8 oz.	3 lb., 2.8 oz.	3 lb., 5 oz.	3 lb., 7.3 oz.	3 lb., 8.7 oz.	3 lb., 2.5 oz.	3 lb., 1.6 oz.
Diff type (F/R)	Ball	Ball	Bearing/Ball	Ball	Ball	Ball	Ball
Chassis	Carbon fiber	Carbon fiber	Fiberglass	Fiberglass	FRP**	Carbon fiber	Nylon comp
List price	\$399	\$385	\$259.99	\$319.50	\$356	\$379.95	\$479
Available at*	\$259.99	\$225	\$219.99	\$190	\$199.99	\$215.99	\$320
Reviewed in	9/97	4/97	1/98	12/96	10/96	—	—

*Prices vary with location **Fiberglass reinforced plastic



SPEC RACING

YOU MIGHT NOT consider yourself a racer, but I bet that you really are. If you've ever run head to head against a buddy—even just to see whose car is faster—then you're racer enough for me.

It's only natural to race; R/C cars duplicate everything that makes full-scale competition exciting—without the risk to life and limb or the prodigious expense of even the most “economical” full-scale racing class. Despite the appeal of competition, however, relatively few hobbyists take the step of actually signing up to race and pit their skills against others in an organized fashion. Why? Sometimes it's a question of expense; speed costs, as the saying goes. In other cases, the learning curve just seems too steep. Digital this, dyno that; who can blame the uninitiated newcomer who decides it might be easier and more fun to just putter around the parking lot? Finally, there is a significant group of would-be racers who could swing the bill for a national-caliber ride but simply cannot devote precious hours to practice time and wrenching on an R/C car.

If any of the above sounds like a scenario you're living, this article is for you. Spec racing puts the priority on fair competition with strict rules and an emphasis on testing skills, not wallets. It's serious competition, and it's serious fun.

This is your guide to taking the racing plunge with spec cars; in addition to taking a look at current “spec-nology,” you'll learn how racing works, what you can expect from your first race and what you'll need to start competing.

Street



The largest and most organized form of spec racing is Street Spec, the class founded by Trinity. Street Spec is unique in that it is not a single-brand class; TRC* and Bolink also produce chassis for the series, and any manufacturer who wants to jump in can submit a chassis design to Trinity for approval. This makes for some variety on the starting line and allows racers to entertain themselves between heats with “My brand's better than yours” arguments. For racers who want to measure themselves against national competition, Trinity sponsors a national event to determine the Street Spec champion.

Although Street Spec machines are less adjustable (and less expensive!) than their “open class” counterparts, they are nonetheless capable, tunable racecars suitable for roadcourse and oval competition on pavement, concrete and carpet. NASCAR, NASTruck and touring-car bodies are available, allowing you to live out just about any full-fendered racing fantasy.

The class rules permit plenty of adjustments to keep things interesting: ride height, caster, suspension damping, tire compounds and differential tightness can be tinkered with to suit track conditions. The more puzzling aspects of chassis tuning, such as wheel camber, stagger and

STREET SPEC FEATURES



BATTERY. Street Spec only, as identified by the large decal. The rugged Street Spec packs are designed to survive many charge/discharge cycles, so racers needn't carry an armload of packs to each race or replace packs often.



TIRES. A gray band indicates that a tire is Street Spec-legal. Racers can choose from two compounds for the rear tires and three for the fronts.



FRONT SUSPENSION. Simple coil springs are used to absorb any jolts. Any aftermarket springs may be used to tune the car, and Street Spec rules permit any type of lubricating fluid to be used on the kingpins for damping. Caster may be adjusted by inserting washers or caster wedges beneath the front arm mounts, but camber changes are not permitted.



GEARING. Street Spec rules permit only a 28-tooth pinion and 120-tooth spur. These are kit-supplied, although any brand may be used for replacement.



GUIDE

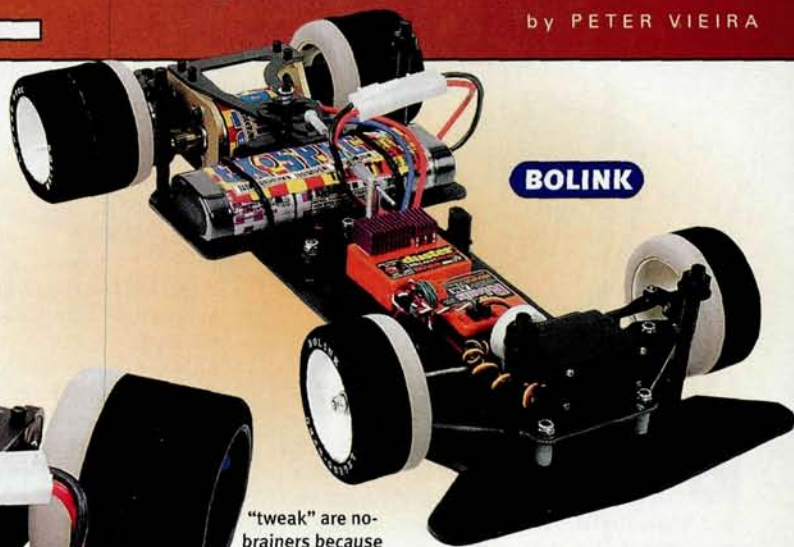
Racing for the rest of us

by PETER VIEIRA

Spec

TRINITY

BOLINK



"tweak" are no-brainers because adjusting them is illegal. I don't think anyone will miss worrying about them!

Equipment choices are also limited, so racers can save money and worry less about what they should buy; only Street Spec batteries, motors and tires are allowed. Spec motors and batteries are easily identified by their Street Spec labels, which must remain intact for the parts to be considered legal. Disassembly of the battery pack is illegal, and Trinity's proprietary Street Spec cells (made by Sanyo) are not sold individually, so racers can't cherry-pick cells. In addition, the supplied Tamiya connectors must be retained, so there's no need for beginners to feel less than competitive because they don't know how to solder their components together.

Spec-legal tires are identified by their distinctive gray bands, and only three compounds are offered: orange, blue and green. The orange-compound tires are for the front of the car only; rear tires are offered in blue and green only (beginner reality check: all tires are actually black, the color designation refers to the paper dot used to label the tires for hardness).

The most compelling rule in Street Spec is this: "If the rules do not specifically say you can do something, doing it is illegal!" That's Trinity's exclamation point, by the way. Mark Donahue, one of full-scale racing's all-time greats, once said that racing is all about finding the "unfair advantage"; that's something you'll have a hard time finding in Street Spec.

RISE HEIGHT. Offset bearing mounts allow the rear ride height to be altered.

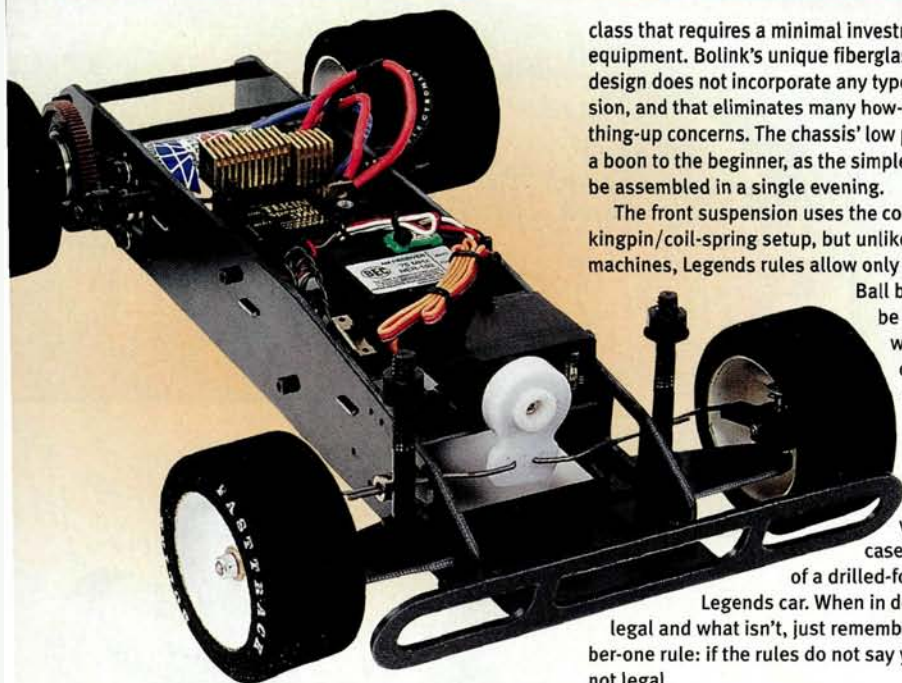


REAR SUSPENSION. As with the front suspension, different types of fluids may be applied to the rear suspension's damper disks to adjust the rear end's responsiveness. The preload of the springs that press the damper disks to the motor plates can also be adjusted, but the kit springs must be used.



ELECTRONICS. To help curb the potentially high cost of racing, Street Spec rules put a \$129.99 price cap on electronic speed controls. Any brand of forward-only ESC is allowed, as long as it uses a Tamiya connector and fits within the price limit. Novak's Duster, Duster II and Explorer are all legal and shown on our Spec cars.





Bolink Legends

Bolink's Legends cars have been popular since they first appeared back in 1992 and can be credited with much of the initial interest in spec racing. The retro-inspired machines are patterned after the full-scale Legends racing class. In this case, "full scale" means only that the driver is full-size; the cars themselves are $\frac{5}{8}$ -scale minis powered by 4-cylinder motorcycle engines.



The R/C Legends cars are strictly regulated and offer few tuning options, so they're ideal for entry-level competitors or any racer who's looking for a fun

class that requires a minimal investment in time and equipment. Bolink's unique fiberglass ladder-frame design does not incorporate any type of rear suspension, and that eliminates many how-do-I-set-this-thing-up concerns. The chassis' low parts count is also a boon to the beginner, as the simple design can easily be assembled in a single evening.

The front suspension uses the common kingpin/coil-spring setup, but unlike the Street Spec machines, Legends rules allow only the stock springs.

Ball bearings may not be added to the wheels, differential, or rear axle, and no substitutions of lighter/stiffer parts are permitted. Parts modifications are also verboten—just in case you were thinking

of a drilled-for-lightness Legends car. When in doubt as to what is legal and what isn't, just remember Legends' number-one rule: if the rules do not say you can do it, it is not legal.

In addition to the strict chassis rules, the Legends class also specifies a certain battery and motor combination. Only Bolink Legends motors are allowed, and power must come from a Bolink Legends 4-cell battery pack. Both are manufactured by Trinity* to be reliable and long-lasting, so batteries and motors will be a once-per-season investment. Thanks to their lightweight chassis, the cars are surprisingly fast with 4-cell power. Although Bolink doesn't specify a maximum price that racers may spend on radio gear and ESCs, it suggests a limit of \$150 on each. Even if you have the extra bucks for top-end electronics, those dollars would be better spent on track time, spare batteries and support gear. It isn't about parts!

For the rank beginner, Legends cars are probably the easiest to understand, build and maintain. They are also a lot of fun to drive, and they reward drivers who take the time to learn how they handle; horsepower doesn't win a Legends race. Finally, they're downright cheap, and I mean that in the best sense. For less than \$70 (chassis and body only), you get a rock-solid, nearly indestructible racecar.

WHAT ELSE DO YOU NEED?

The Street Spec and Legends cars can all be purchased with the class-legal battery and motor included. However, you will still need a transmitter and receiver, steering servo, electronic speed control and battery charger before you can go racing. Here are a few things to keep in mind when you choose your gear:



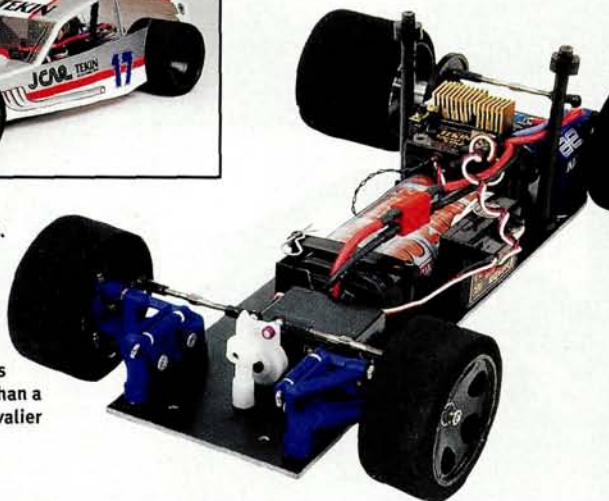
PHOTOS BY WALTER SODAS

Do-it-Yourself Spec Class

Reduced to its core, spec racing is literally about specifications—hence the term. While the Street Spec class of vehicles and Bolink's* Legends cars provide a set of specifications that allow racers to compete on a much needed "level playing field," these aren't the only ways to go spec racing. You could, for instance, create your own class.

Jay Hawley did just that with his "J-Car" class, which he created in 1989 as an alternative to the all-out racing he had been involved with until then. "After a full season of racing, I'd have a bill for \$2,000 and nothing left but a bunch of pieces. That wasn't so much fun," he explains. "I saw people leaving the sport—good racers who gave up because they couldn't get to the A-main, but not for lack of skill. I thought there should be a spec class for guys who know how to race but want to do it less expensively."

Jay's goal was to create a tunable car that could handle but would also be bomb-proof and cheap. The resulting "J" car was designed around existing parts that any veteran pan-car racer would have: an Associated* front end, Associated or Trinity motor-pod plates and Associated battery boxes. These are bolted onto a J-Car chassis, which is little more than a slab of G-10 fiberglass with the appropriate holes drilled for the components. A Bolink Cavalier wedge body covers the simple chassis, lending the car a unique look.



CHARGER

A good peak charger is one of the best racing investments you can make, and the latest units are easier to use and more affordable than ever. When pricing chargers, keep in mind that some units are DC only; they require a car battery or DC power supply to operate. An AC/DC unit can be plugged into a wall outlet, but these are more expensive. The least expensive chargers are the AC-powered mechanical timer types. These will get the juice into your packs, but they take longer and do not shut off automatically when the pack has peaked (reached maximum capacity), and that can lead to over-charging. As long as you monitor your packs as they charge, you shouldn't have any problems. The MRC® Super Brain, Novak Rhino, Tekin BC5A and LRP Micro Charger are all reliable peak chargers worth considering, while Hobbico®, Dynamite® and Tower Hobbies® offer solid mechanical units.



STEERING SERVO

In addition to a receiver, your radio should include at least one servo. Each manufacturer's "standard" servo produces at least 30 oz.-in. of torque—plenty for spec-type racing. As your skills improve, you might switch to a faster servo or lighter servo, but this will by no means be a necessity.

ELECTRONIC SPEED CONTROL (ESC)

Street Spec rules cap the price at \$129.99, while Legends rules suggest a max of \$150 retail. Don't feel you need to spend that much! Purchasing an ESC that's at the top of the price spectrum won't give you any real advantage over the guy with a "base" model. Buy the best you can afford, but don't worry if it isn't close to the price max. Some suitable choices are Novak's Duster, Duster II and Explorer, Tekin's® Formula 10, Command 10 and Speedstar, DuraTrax's® Streak and Spike, Trinity's Monster FET and LRP's® Indy 200.

TRANSMITTER AND RECEIVER

You don't need an expensive FM radio system to go racing, but you should look for a unit with dual-rate steering. Dual rate allows you to adjust the steering travel of your car's front wheels as you drive, so you can dial in just enough steering to get around the track. The Airtronics® Rival RV2P, Futaba® Magnum Junior, JR® Python and Hitec® Lynx all offer this feature. They're all good radios, so I recommend you base your choice on ergonomics; if it feels good, buy it!

Motors and batteries are regulated, but not as stringently as in other spec classes; any battery type is allowed, as long as it's a stick pack of unmatched cells, and a connector of any type is used. Motor rules vary with the race site. Jay runs a regular season of events at the K&N Raceway in Stafford, CT, and R/C Madness in Enfield, CT. Trinity Sapphire machine-wound mods are the legal motor for K&N, while R/C Madness rules allow any stock-motor armature to be used in a modified can; this allows the comms to be trued, and that lengthens their service life. "When the stock-class guys toss their motors, we pop the endbells and get free armatures," says Jay. Talk about racing on the cheap!

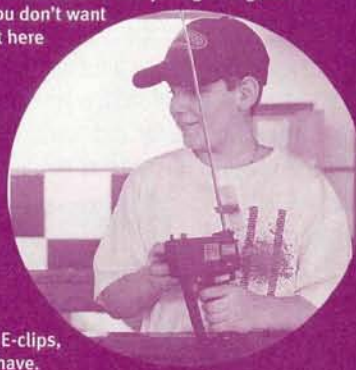
The lesson to be learned from the J-Car class is this: you can make your own racing. If, for instance, you and your buddies all have Traxxas Sledgehammers and you want to start a class for 'em, do it! Most track owners will gladly set up any class their customers want to run, as long as there are at least four or five folks who want to sign up. You can decide what will be allowed and what won't. If you do it right and follow the rules you lay down, you'll probably see your class grow! I think all racers would agree: no matter which kind of vehicle you race, the best racing is close racing.

YOUR FIRST RACE

You say you've got the racin' bug, but are a little intimidated about starting out? Don't be! Unless you live in Scroogeville, there will be any number of people at the track to offer you advice and lend a hand. Of course, a little info on what to expect always helps, so here it is: your first day at the races!

1. A good day at the races starts the night before the race. Confirm the race schedule with the track operator, and be sure to ask how much it will cost to enter your class. Give your car the once-over to make sure everything is in good condition and write out a checklist of stuff you don't want to forget. You'll have your own additions, but here are the basics:

- Car.
- Transmitter (with fresh AA batteries).
- Extra transmitter crystals, if you have any.
- Charger.
- Three or more battery packs.
- All the tools you used to build the car.
- An old towel to "pit" on.
- Folding chair (and table, if necessary).
- Extension cord.
- Money (for entry fees, emergency parts replacement and a snack or two).
- Any spare parts you think you might need: E-clips, body pins and pinion setscrews are good to have.



2. Get to the track early, so you'll be able to stake out a good pit space and get plenty of practice time. Tell the track operator which class you plan to run in, and sign up. Be sure you know your radio frequency; you'll have to put it on the sign-up sheet.

3. Time to practice. Find the rack of frequency clips and grab the one that matches your frequency. As long as you have the clip, no one else with your frequency will put his car on the track. But don't hog it! If someone else wants to run, give 'em the clip when you're through. You'll get it back after his run.

4. Use your first pack to get used to the car and track. Unless your setup is waaaay off, you shouldn't be making any changes yet; just get 4 minutes under your belt. If the car has handling problems you can't live with, you'll have time to wrench, and since you got there early, the track owner shouldn't be too busy to lend a hand and offer advice.

5. Once your setup feels good, concentrate on practicing and getting used to the car; you shouldn't be changing stuff up till the last minute. Keep an eye on the clock; you need to leave yourself enough time to recharge your packs before your first heat.

6. When the heats are posted, find your car number and memorize it; this number is your transponder number. The transponder fits under your car's body and allows the track computer to count your laps; you'll need to make a 1/4-inch hole in your body to mount it. The transponder is held in with a body pin, so be sure to have an extra on hand.

7. At most tracks, you'll race three times; these races are "qualifiers" and are used to determine where you'll be placed in the main event. The better you do in the qualifiers, the closer you get to pole position for the main. If there are a lot of entrants in your class, there might be more than one main event; the fastest guys will go into the "A" main, the next group will form the "B" main, and so on.

8. When you race, try to run as "clean" as possible. You will rub fenders and get into crashes, but make efforts not to. Everyone excuses a beginner, but no one tolerates a hack! If the leader is coming up behind you, don't block or try to race him; let his car through. Once he has passed, try to learn something by following his lines through the turns. This is the best way to get fast!

9. Keep your cool, if you're getting trounced. The madder you get, the slower you go. Relax. Race against yourself; after all, you can't do any better than your best. After each heat, your lap times will be posted. If you're getting faster with each heat, be happy. It takes practice to become a good racer.

10. When the day is done, congratulate the winner, and give a "Good race" to the guys you were close with. Thank those who helped you. Before you go, clean up your pit area. It's just common courtesy, and it's also your best defense against forgetting to take stuff home!

*Addresses are listed alphabetically in the Index of Manufacturers on page 201. ■

TUNING ACCESORIES

D I A L I N ' - I N

ALTHOUGH SOME racers get lucky and manage to dial their cars in by the old eyeball method, the rest of us need some way to measure the parameters of our machines before we can start tuning them to the track conditions that meet us. How much camber, toe-in and caster? Is my car tweaked? Which spring rates have I got? These are the questions we ask ourselves because the answers will help us improve. To find those answers, we have collected the most useful products for measuring and calibrating your car, from gauges for your glow engine to balancers for your buggy wheels; after all, the more you know, the faster you go.

RPM Precision Camber Gauge

Part no. 7099 Price \$9.95

What it does. Precisely measures up to 10 degrees of positive or negative camber.

Compatible with all vehicles.

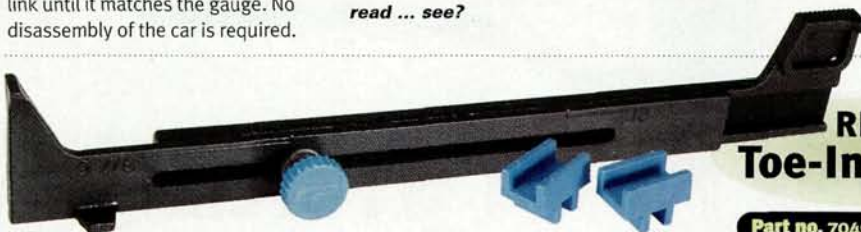
How it works. With the car on a flat surface, put the camber gauge against the side of the wheel to be measured. Loosen the thumbscrew and position the gauge so that its bottom "foot" is flat against the work surface and its vertical surface is flush against the wheel. Tighten the thumbscrew to hold the measurement. You can also pre-set the gauge to the setting you wish to use for your car, then adjust the camber link until it matches the gauge. No disassembly of the car is required.



The RPM Camber Gauge couldn't be any easier to read ... see?

Just press the gauge against the wheel for a quick camber reading.

PHOTOS BY WALTER SIDAS



RPM Toe-In Gauge

Part no. 7049 Price \$9.95

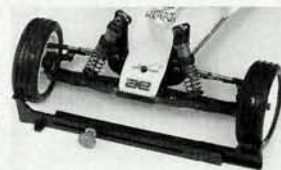
What it does. Measures toe-in/out.

Compatible with all vehicles; works best with off-road machines.

How it works. With your off-road vehicle ready to run and at the desired ride height, position the gauge beneath the car and align it with the outer ribs of the front tires' back edges. Then remove the gauge and align it with the same ribs from the front of the tires. The RPM* gauge will show the difference between these two measurements as the toe-in in degrees. The unit is calibrated with a single mark for each degree of toe, so it's very easy to read. To measure toe-out, start from the front of the vehicle and then measure the rear edges of the tires. A pair of riser blocks is included to raise the gauge when taking measurements from truck tires, or to raise the chassis of vehicles with insufficient ground clearance to allow the gauge to be placed beneath them.



If your car doesn't have sufficient ground clearance for the gauge to slip under the chassis, use the included riser blocks to raise the car.



The RPM Toe-In Gauge compares the distance between the front and rear edges of the front tires to determine toe-in.

GLOSSARY OF TUNING TERMS

- **Bump-steer:** If a car's toe-in or toe-out change as the suspension is compressed, the car is said to have bump-steer.
- **Camber:** the angle of the wheels when viewed from the front of the chassis; if the wheels are vertical, they have zero camber; if they lean away from the chassis, they have positive camber; and if they lean inward, they have negative camber (most cars use zero camber or a couple of degrees of negative camber).

- **Camber gain:** if a car's camber setting changes with suspension travel, the car is said to have camber gain; for instance, a wheel with -2 degrees of camber at rest may have -4 degrees when the suspension is fully compressed.
- **Caster:** a car's steering hubs pivot on an axle called a kingpin; the kingpin angle is called caster. If the kingpin leans toward the rear of the car (as it does on most cars), it is said to have positive caster. A vertical kingpin has zero caster, and negative caster would angle the kingpin forward.

- **Compression** (in glow engines): an internal-combustion engine's piston squeezes the air/fuel mixture against the cylinder head before the glow plug ignites it. This is called compression. Knowing an engine's compression pressure allows performance to be anticipated and wear to be measured.
- **Deck height:** the distance from the top of an engine's piston at top dead center (the piston's highest position in the cylinder) to the bottom of the cylinder head's internal surface.

ACCESSORY GUIDE

DEVICES by Staff of R/C Car Action

RACETECH Motor Timing Gauge and Stand

Part no. 3001 Price \$7.95



What it does. As its name implies, the Motor Timing Gauge is used to set and adjust the timing of your modified motor. It also makes a handy motor stand for capacitor installation, break-in and other maintenance chores.

Compatible with: any 05-type R/C car motor will fit the RACETECH timing gauge.

How it works. The timing gauge features a sighting hole that lines up with the motor-mounting holes to guarantee correct motor position. A single motor

screw fixes the motor in place, allowing the endbell to be rotated. Degree markings are molded into the unit at 2½-degree intervals to indicate up to 25 degrees of advanced or retarded timing.



RACETECH's motor-timing gauge is also handy for maintenance.

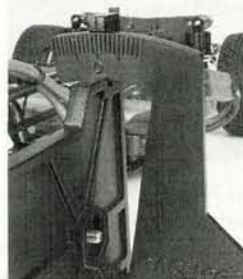
RACETECH Camber and Toe-in Gauge

Part no. 9007 Price \$32.95

For touring cars

Part no. 9006 Price \$32.95

For Losi and Associated off-road cars and trucks

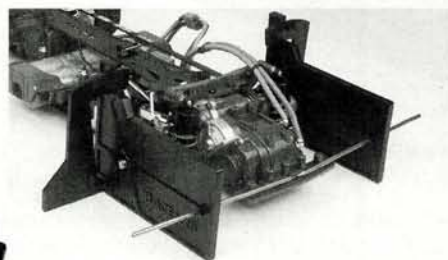


Zero camber, on the nose. The RACETECH gauge registers up to 10 degrees of positive or negative camber.

What it does. Measures camber, camber gain, toe-in/out, and bump-steer.

Compatible with: RACETECH's* touring-car gauge will fit any vehicle with a 12mm hex hub (most notably HPI, Tamiya, and Kyosho). The off-road version works with Associated and Losi trucks and buggies.

How it works. A pair of plastic plates ("gauge plates") replace the front wheels of the car to be tested. These plates are equipped with pointers that indicate the wheels' relative toe-in or toe-out. This angle can be measured with a protractor if you wish to know the actual toe measurement. The gauge plates pivot in "degree plates" that indicate camber in degrees; the RACETECH unit can measure up to 10 degrees of positive and negative camber. By activating the vehicle's suspension while it is in the gauge, camber gain can also be checked.



Any sedan with 12mm hubs can be easily aligned with RACETECH's camber/toe-in gauge.



• Ride height: the height of the chassis with all the components installed and the suspension compressed by the vehicle's weight.

• Spring rate: in simple terms, the force needed to compress a spring. Numeric values reflect the number of pounds it takes to compress a spring 1 inch; for example, if a spring requires 3.2 pounds to compress it 1 inch, its rate is 3.2.

• Timing: modified motors have adjustable timing; timing refers to the position of the motor's brushes in relation to its

magnets. If the brushes are centered over the magnets, the motor has zero timing. If the endbell (which houses the brushes) is rotated against the direction of the armature's rotation, the timing is advanced and rpm are increased. If it is rotated in the same direction as armature rotation, timing is retarded, and that inhibits performance.

• Toe-in/out: the angle of the front wheels when viewed from above; if the wheels' front edges point inward, the car has toe-in, and if they point out, well, you know. Although most often used on front wheels, many cars (particularly off road

machines) use toe-in on the rear wheels as well.

• Tweak: a car with no tweak will have equal weight on each of the rear wheels. A car is tweaked when more weight is on one wheel than another.

• Wedge: in simplest terms, wedge is the difference in weight distribution between the left front and right rear tires as compared to the right front and left rear tires. This has dramatic effects on handling—but that's another article!

TUNING ACCESSORY GUIDE



VICTOR ENGINEERING IQ Equalizer scaling system

Part no. VE-IQEQUALIZR Price \$499



One scale for each wheel—simple. The leveling board ensures error-free readings.

What it does. The IQ Equalizer precisely measures the weight distributed to each wheel of a vehicle.

Compatible with all $\frac{1}{12}$, $\frac{1}{10}$ and $\frac{1}{8}$ vehicles.

How it works. The Victor Engineering* IQ Equalizer uses four highly accurate digital scales to measure the weight distributed to each of a car's wheels. To prevent an uneven surface from affecting the readings, the Equalizer has a plastic/aluminum laminate base with leveling feet and a bubble level. The scales are labeled for each wheel ("RR" for right rear; "LF" for left front, etc.) so that the same scale is always used on the same wheel. The ready-to-run vehicle is placed on the scales and settled on its suspension; then the weights are noted. This data is invaluable for tuning. With Victor's included formulas and a cal-

culator, the following can be determined:

- percentage of vehicle weight on each wheel;
- percentage weight difference between any two wheels;
- percentage of weight distributed to each half of the chassis;
- total vehicle weight;
- "wedge" percentage.

Victor also offers a program for any Windows PC that will allow you to input the scale's data and instantly get the percentages described above (part no. RCCAR, \$99.95).

If unused for more than 90 seconds, the scales will automatically shut off, thus extending the life of the included lithium batteries. To complete the package, Victor Engineering includes a padded vinyl case to store and transport the IQ Equalizer.

HOLESHOT Wheel Alignment Board

Part no. 6650 Price \$43.95

Metric version

Part no. 6600 Price \$43.95

U.S. version—non metric

What it does. The metric Alignment Board will indicate the camber, caster, bump-steer and toe-in/out of any vehicle with 4 or 5mm axles. The 6600 version fits all vehicles with $\frac{3}{16}$ -, $\frac{1}{8}$ - and $\frac{1}{4}$ -inch axles.

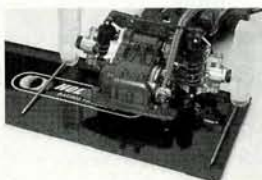
Compatible with most $\frac{1}{12}$ and $\frac{1}{10}$ vehicles; some $\frac{1}{8}$ on-road vehicles.

How it works. Clear acrylic alignment blocks are attached to the front axles in place of the wheels. These blocks feature a rounded end that allows them to pivot on the alignment board, and brass pointers are inserted into the blocks to indicate toe-in. A line is also scribed on the blocks to help determine caster, and an RPM camber gauge is included to take camber measurements from the alignment blocks.

• **Toe-in.** To measure toe-in, the Holeshot* alignment board has a row of tiny holes drilled in it; each hole represents 1 degree of toe-in, and zero degrees is indicated by a pair of holes. The pointers sweep across these holes as toe-in is adjusted. A car's suspension may be activated while it is installed in the gauge, and that allows bump-steer to be checked.

• **Caster.** Measure caster by visually lining up the suspension's kingpin with the line scribed on the alignment block. Then use the RPM Camber Gauge to measure the angle. The perfectly flat surfaces of the board and alignment block yield very accurate readings.

• **Camber.** Measure camber simply by placing the RPM gauge against the side of the alignment block, as you would if there were a wheel in place.



The Holeshot unit's precision parts are easily installed after removing the car's front wheels. The pointers indicate toe-in.

What it does. The Speedmax* alignment tool is designed to accurately indicate your touring car's front and rear toe angles, front and rear ride heights and weight distribution (tweak). The tool can also be used to measure camber with one of RPM's popular camber gauges (featured elsewhere in this guide).

Compatible with all touring cars with 4mm axles.

How it works. The tool includes two measuring wedges and four, six-sided wheel disks that users attach to the car's axles in place of the wheels. The tool comes with everything you need to adjust ride height and chassis tweak, but to use it to adjust toe-in/out, you'll need to pick up some graph paper (preferably 11x17 inches) and an inexpensive protractor.

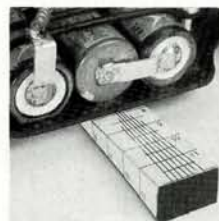
Place the ready-to-run car on a flat surface. Next, remove all four wheels and install the wheel disks on the axles. Each side of the hex-shaped wheel disks has a molded-in number that represents a tire diameter: 63, 64, 65, 66, 67 and 68mm. Measure the diameter of your tires, and set the disks so that the car sits on the sides marked with the diameter that matches your tires. This allows you to make measurements with the car at the same ride height as your race setup.

• To check front and rear ride height, simply slide the measuring wedges under the front and rear of the car until they touch the chassis, and note the measurements. The wedges will measure ride height from 3 to 11mm.

• To check tweak, slide one of the wedges under the right side of the chassis and note the measurement, then do the same for the left side. If the left and right measurements do not match, your car is tweaked.

SPEEDMAX Alignment Tool

Part no. MZ-001 Price \$19.99



Slide a wedge beneath the car until it touches the chassis; this is your car's ride height. Here, it's 8mm.



Used with a piece of graph paper, the Speedmax tool can measure toe-in.

Continued on page 110

TUNING ACCESSORY GUIDE

Continued from page 108

- To check front and rear toe, you'll need a large sheet of graph paper and a small, preferably transparent, protractor. The measurement wedges are slotted so that they may be attached to the wheel disks. Once the wedges have been attached to the wheel disks, they act as pointers and will indicate the wheels' toe angle. With the car on a piece of graph paper, you'll be able to check measurements accurately by using the protractor to measure the angle formed by the wedges' flat sides and the lines on the graph paper.

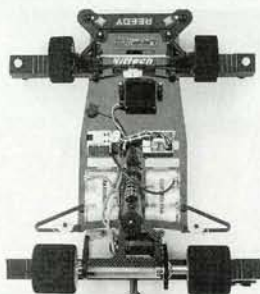
NIFTECH Precision Tweak Board

What it does. Allows the user to easily check and adjust chassis "tweak."

Compatible with all $\frac{1}{12}$ -, $\frac{1}{10}$ - and $\frac{1}{8}$ -scale on-road and oval vehicles.

How it works. Niftech's* Tweak Board is easy to use. Once assembled, the unit is leveled by means of its adjustable feet. The ready-to-run test vehicle's front wheels are placed on the stationary front rail, using the inscribed marks to precisely center the chassis (these marks also indicate the ROAR measurements for maximum legal width, so you can tech your car as you check its tweak). The rear wheels are centered on the rear rail, which slides back and forth to accommodate the differing wheelbases of various vehicles. With the car properly positioned, its front end is held and the right rear wheel is given a sharp tap to activate the chassis suspension. The same is done for the left rear wheel. Once the rear wheels have settled, a bubble level on the rear rail indicates the angle of the rear pod at rest and, hence, tweak; the user can now make adjustments to the car's T-plate or lateral dampers accordingly. This visual method allows the user to make quick readings; it takes only a moment to put the car on the board after soldering cells, installing the transponder, or making other small changes that will affect tweak. These tweak adjustments make for consistent results on the track.

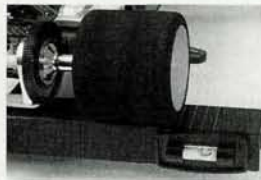
The Niftech unit is accurate to within 3 to 5 grams (translation: it's really sensitive) and is easily disassembled via a single thumbscrew to be stowed in your pit box.



Niftech's Precision Tweak Board is a must for any pan-car racer.



The bubble level never lies; this car has a bit of tweak. Note the scribed lines used to center the car on the gauge.



DYNAMITE Compression Gauge

Part no. DYN2514 Price \$44.95

HOBBICO Compression Gauge

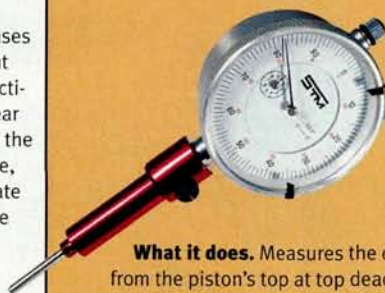
Part nos. HCAP 2600 HCAP 2601 Price \$34.95 each



What they do. Compression gauges measure the pressure generated by the piston as it squeezes the air/fuel mixture against the top of the cylinder.

Compatible with all .10 to .60 glow engines (HCAP 2600, DYN 2514); larger engines use Hobbico HCAP 2601. (adapter required for gas engines; part no. 2610, \$7.99)

How they work. The gauge replaces the glow plug and is activated by using the engine's pull-starter or a bump starter to turn the crankshaft (remove the fuel line first). It takes about five revolutions to fully pressurize the engine for a good reading. Compression is indicated in pounds per square inch (psi) on the dial face. Compression readings are helpful to determine engine wear, especially if a base reading can be taken when the engine is new; as the piston and sleeve wear, they will produce lower compression readings.



DYNAMITE Deck Clearance Gauge

Part no. DYN2600 Price \$39.95

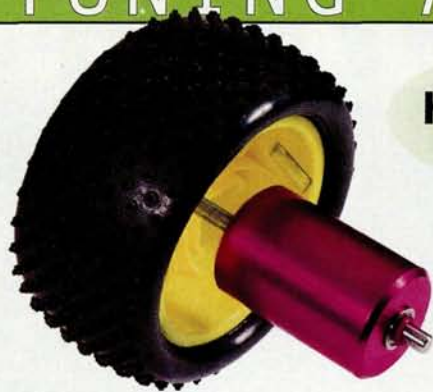
What it does. Measures the distance from the piston's top at top dead center (TDC) to the bottom of the cylinder head.

Compatible with all glow engines.

How it works. Remove the engine's glow plug and position the piston at TDC. Install the gauge by hand-tightening it into the glow-plug hole so that its tip contacts the piston. This is "zero," although the needle will point elsewhere on the gauge's face. To calibrate the unit, rotate the face until zero lines up with the needle. With the gauge installed, remove the engine head and place it on a flat surface. This will further compress the gauge's tip, indicating the deck clearance in hundredths of an inch on the unit's dial. With this tool, you can now determine whether you need to add or subtract head shims to advance or retard the engine's ignition timing or to meet a manufacturer's head-clearance specs. You can also use the Dynamite* gauge to check head clearance after installing a new piston and/or sleeve.



TUNING ACCESSORY GUIDE



Part no. RC6063 Price \$24.99

Off-road

Part no. RC6064 Price \$25.95

Touring car

Part no. RC6064 Price \$24.99

On-road

What they do. Both units will find the "heavy" side of a wheel and tire, allowing them to be balanced with lead tape (included).

Compatible with

Trinity*: Losi and Associated rear wheels, Associated fronts (RC6063); all 4mm axle touring-car wheels (RC6069); rear pan-car wheels (RC6064).

Top Flite*: all wheels and tires and virtually any rotating part.

How they work

Trinity: features a purple-anodized, billet-aluminum handle that contains a precision balancing shaft that rides on a pair of ball bearings. The wheel to be balanced is slid onto the shaft (it's a friction fit) and allowed to rotate until the "heavy" side settles to the bottom. For on-road rear wheels, the wheel and hub are mounted to the shaft. Lead tape is then used to compensate for the heavy side until balance is achieved. A flat side has been machined into the handle so the unit

TRINITY Hand-Held Tire Balancer



The Top Flite balancer collapses into its support legs to form a handy carrying case.

TOP FLITE Precision Magnetic Balancer

Part no. \$TOPQ5700 Price \$25.95



can sit on the edge of a table. This keeps the balancing shaft parallel with the ground for best operation.

Top Flite: uses a pair of magnets to hold a hardened-steel balancing shaft. Only one end of the shaft touches a magnet; the other end is supported in midair by the attraction of the other magnet. This results in a nearly friction-free assembly that allows highly accurate balancing. A pair of cone-shaped wedges slide along the shaft to accommodate any axle opening. If you also like to fly and float with R/C, the Top Flite balancer is very handy for boat and plane props and anything else that spins. When not in use, the unit collapses into its side plates to form a carrying case.



Just insert a spring and depress the plunger; the Spring Matcher makes it easy to see spring rate.

PERFORMANCE HOBBY Spring Matcher

Part no. PHM-Too3 Price \$24.95

What it does. Allows spring rates to be compared for matching and tuning.

Compatible with all coil-over shock springs for 1/10-scale touring cars, off-road vehicles and 1/8-scale buggies.

How it works. The Performance Hobby* Spring Matcher includes a control spring, indicator piston, three spring-rate collars and a stepped plunger to compress the test springs. Load the control spring and indicator piston into the aluminum tube, followed by the spring you wish to test and then the plunger. As the plunger is compressed to each of its three stops, a collar is slid up to the position marked by the indicator piston. When the plunger bottoms out, the three collars create a "picture" of the relative spring rate; soft, or "light," springs bunch the collars together; stiff, or "heavy," springs will space the collars farther apart. If the three collars are evenly spaced along the Spring Matcher, the test spring is single rate; if the collars become spaced farther apart as the spring is compressed, it is a rising-rate spring.

**Addresses are listed alphabetically in the Index of Manufacturers on page 201.*



GET UP TO SPEED WITH...

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- 118 **RACE COVERAGE** • Drag action at the IEDA Worlds

Nobody knows high-velocity R/C like drag racers do, and we have some of the fastest right here in Racer News; just check out our coverage of drag racing's Mecca, the IEDA Worlds.

You can't think of going fast without thinking motors, and you can't think motors without thinking Trinity. Ernie Provetti,

head honcho of the well-known company, sat down with *R/C Car Action* for this month's Innovator at Work installment. Interesting stuff!

Since this is *Racer News*, you'll be pleased to find our interview with Associated's Mark Pavidis, our Racer's Tip of the Month from Cliff Lett, and a bunch of new, go-fast goodies from Team Losi and MIP. Gentlemen, on the tone

INNOVATOR AT WORK

ERNIE PROVETTI



R/C Car Action: How did Trinity start? I know your roots are in slot cars.

Ernie Provetti: I was studying to be a Roman Catholic priest and was one year from my final vows when I had a massive change of direction in career plans. A philosophy major at the time, I questioned a lot of things that were happening and where my life was going. I told my mom about my change in plans, and I remember her saying, "What's everybody going to say?" I told her, "I've got this dream. I'd like to go into the slot-car business." I had been racing slot cars since I was a kid, and Tony P.—now president of Trinity—had a successful business building slot-car chassis. I told her, "Let me try this for a few months, and if it doesn't work out, I'll go to law school." I had been accepted to Harvard Law school that year. She agreed, and we took all the furniture out of one room for a shop, then Tony came over and we made wooden benches. I got a drill press and a Unimat and some other things with \$1,000 I borrowed from my grandfather. That's how we started.

RCCA: When did R/C enter the picture?

EP: A few years down the road, Tony saw a Bolink R/C car and basically said, "This is the future." We got into the business by rebalancing R/C motors, which no one was doing, and applying our slot car knowledge to R/C motors which were just evolving at the time.

Few of the many personalities in the R/C industry have been as influential on the hobby and the sport as Ernie Provetti has been. As the driving force behind Trinity products, Ernie and his company have changed the way we look at the profession of racing; indeed, he has paved the way for the first professionals in the sport. A self-made man, Ernie's success in business and on the track has come about through personal effort and sacrifice. He has also collected a lot of great stories along the way!

RCCA: How did Trinity's own motor line come about?

EP: It almost didn't happen. In 1981, there was a ROAR nationals at Rattey's in Boston. We went to the race, where I met Joel Johnson. We sponsored Joel, supplied his motors, and he began winning National championships that had previously been dominated by Associated; up until that point, no one had beaten them. Then in 1984, we took a gamble and went to Japan for the All-Japan Championships. We missed the first heat because we couldn't understand when they were calling Joel's name—we didn't speak the language. The second heat, he had the wrong frequency. On the third heat, I said to him, there's no pressure but our entire future rests on the next eight minutes. He won by a lap, there was a sea of photographers, and I was approached by a young Aki Suzuki on behalf of Kyosho, who invited us to visit their facility. There, while marveling at their offices, I met Hisashi Suzuki, Kyosho's president at the time, and weeks later received a letter from Mori Matsumoto indicating Kyosho had an interest in pursuing business with us. They initially sent 500 motors on account—we had spent all our money to get to Japan! Within a year, we were selling 40,000 motors a month, and the rest is history.

RCCA: Ernie, Trinity always seems to have the innovative ideas in motor technology. How do you do it?

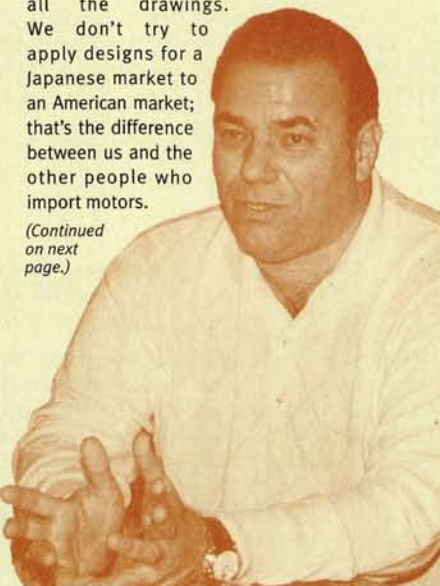
EP: We brainstorm for a few weeks, call meetings, gather everyone involved with the racing program and start talking about how we can

make the motors better. In the case of the Midnight 2, we put a Midnight and an X-Star on the conference-room table and had everyone offer their ideas on how we could improve the current designs. Everybody agreed that we needed to make a flat motor and change the armature design.

RCCA: The flat can design is quite a leap from what the hobby is used to. How did you make it happen?

EP: Every part of the motor is designed here at Trinity. Tony P., Neil McCurdy and Mike Wood did all the drawings. We don't try to apply designs for a Japanese market to an American market; that's the difference between us and the other people who import motors.

(Continued on next page.)





RACER **n**ews

INNOVATOR AT WORK

(Continued from previous page.)

RCCA: Trinity seems to be very adept at marketing celebrities—most notably, Brian Kinwald. What does that do for Trinity?



EP: First and foremost, you have to have a good product, but brand awareness is a key factor in anyone's equations; look at the relationship between Nike and Michael Jordan. Brian has done things in this industry that are similar to Jordan's success in the NBA. He wins just about every race he goes to; he's on the leading edge. We feel some people show up at a race because Kinwald's going to be there. He's a draw for us and the industry.

RCCA: Which products do you feel have been your most important?

EP: The most successful would probably be the Monster Stock Motor; that was the first product that put us "on the map." From there, we built the trademark with the Godzilla logo and Monster Horsepower. Of course, our relationship with Sanyo is a big thing also.

But I think the most important product for us, and for the industry, is the Street Spec concept. Cost-controlled racing. We're promoting a concept, and it's about limiting technology and limiting the amount of money a racer can spend. When I first got into R/C, ROAR had a production class. You built the car out of the box, and that was it. No hop-up parts, no add-ons. If you so much as cut the servo saver, you were DQ'd. This was the biggest class! Anyone could go into a hobby shop and buy a car, build it and not have to worry that somebody else spent every night of the week drilling out their chassis or putting aluminum parts on it, or whatever. That's what Street Spec is all about. With Street Spec, you can buy a car—ours, TRC's, or Bolink's—build it, and that's it. You've got a motor with marked brushes—there's no cheating on that—the batteries are only sold as sealed packs so you can't match the cells, you can't dyno the motors or modify the chassis; none of that stuff. There's your car and your transmitter and a bunch of guys having fun. Street Spec is a bridge to help new people join the hobby.

RCCA: What's new on the horizon for Trinity?

EP: Our acquisition of TRC, the tire manufacturer. We plan to apply cost-control production techniques to the business that hopefully will help promote racing. Come tour our new facility, just opened this year, and I'll give you the details.

RCCA: Thanks, Ernie; we'll take you up on that!

RACER TIP OF THE MONTH *Cliff Lett Team Associated*

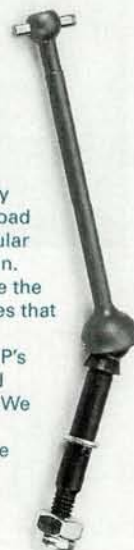
Seventy-five percent of the dialing-in process is directly related to tires. Don't try to make any other adjustments to your vehicle until you install tires that will allow you to drive around the track without spinning out or pushing through the corners. Once you've found the right tires, you'll be able to make subtle adjustments to the suspension that will actually make a difference in the car's performance. It's also very important that you make only one adjustment at a time and immediately test the results of that adjustment on the track, before you make any additional adjustments. If you follow these simple rules, you'll become a better R/C mechanic and a better driver.

Speed Shop

LET MIP REDUCE THE MASS

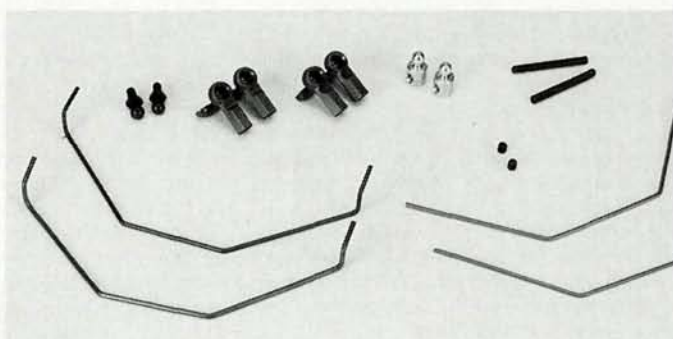
MIP has recently released new aluminum constant velocity drives (CVDs) for all Team Losi and Team Associated off-road vehicles. The new CVDs are considerably lighter than regular CVDs, and this means less rotating mass in your drive train. Quicker acceleration out of the corners and higher rpm are the result of installing aluminum CVDs. MIP's testing concludes that aluminum CVDs are just as durable as the steel versions.

To reduce rotating mass even further, install a set of MIP's Light Drives in your vehicle along with the light CVDs, and you'll notice a big increase in acceleration and top speed. We decided to see exactly how much drive-train weight we could reduce on our Associated RC10B3 by installing these lightweight pieces, and here's what we discovered.



Make your Street Weapon more lethal with new **TEAM LOSI HOP-UPS**

TEAM LOSI HAS released some new items for the exciting Street Weapon touring car that are designed to give you more tuning flexibility than ever before. First are the computer-designed and track-tested swaybars, part no. A-4150; price—



\$13.95. The set includes both "light" and "heavy" precision-bent music-wire swaybars for both the front and the rear. The swaybar set also includes all necessary hardware and illustrated instructions for tuning and installation. These swaybars allow you to dial out the car's roll characteristics in precise increments; this permits you to divert traction to the front or the rear, as necessary. Swaybars are especially useful when racing on high-bite tracks where traction rolling is a problem. Installing swaybars for these conditions will make the car more responsive and give you better control in the corners.



RACER PROFILE MARK PAVIDIS

This month, we talk to one of R/C racing's most established figures: Mark Pavidis. Mark has raced for Associated for the past 13 years, delivering one of the A-team's 15 world championship victories in the process. For the past eight years, Mark has been part of the R&D team at Associated, and his input helped bring the T3 and the B3 to life. Let's talk to Mark.



VITAL SIGNS

Age: 25

Occupation: Assistant R&D manager

Years racing: 13

Sponsors: Associated, Reedy Modifieds, Pro-Line, LRP, MIP and Airtronics

Major victory: '95-'96 IFMAR 4WD Off-Road World Champion

R/C Car Action: What is your favorite class of racing?

Mark Pavidis: I really enjoy gas racing, because the races are a lot longer and it's a lot more like full-scale racing. There's nothing like the noise and smell of gas racing.

RCCA: What are your favorite pastimes, excluding R/C?

MP: I like motorcycle riding, and I also like to go to Las Vegas with my friends.

RCCA: Which is your favorite car, and why?

MP: I really enjoy all types of R/C racing, from gas to electric. But I would have to say that the Associated RC10B3 is my favorite car. I enjoy racing the B3 because the 2WD class is very competitive and the B3 provides an awesome driving experience.

RCCA: What do you consider to be your most rewarding R/C experience?

MP: My most rewarding experience—hands down—was winning the 4WD IFMAR World Championship in Japan, back in 1995. This race stands out in my mind, because it allowed me to achieve one of my goals—to win an IFMAR World Championship.

RCCA: Whom do you consider to be your toughest competitor?

MP: There's no question that Brian Kinwald is my biggest racing competitor. Brian and I have been racing each other for many years now, as teammates as well as rivals. We've had some of the best head-to-head battles I can remember.

RCCA: Speaking of goals, what are some of the short- and long-term goals that you have set for yourself?

MP: The R/C industry is a major part of my life at this time. I guess winning the 1/8-scale Worlds in Portugal is a short-term goal that I wish to attain. Racing 1/8-scale off-road vehicles is a hobby that I enjoy doing on my own time. As for long-term goals, I see myself working in the R/C industry in the future. I'm also very much looking forward to starting a family with my wife-to-be, Susan.

RCCA: Against whom do you enjoy racing the most?

MP: I enjoy racing against my friends Chris McElroy and Jay Katz. These guys race to have fun, and they couldn't care less whether they win or lose. They seem to take the seriousness out of R/C racing, and I find that very refreshing.

RCCA: Thanks for your time, Mark; we wish you much success in all your future endeavors.



Regular CVDs (pair)26 grams
Aluminum CVDs (pair)18 grams
Difference 8 grams

Stock outdrives20 grams
MIP Light Drives15 grams
Difference5 grams

Total weight savings13 grams

As you can see, the MIP Aluminum CVDs and Light Drives saved approximately 1/2 ounce of rotating mass, which is the same as reducing 1 ounce of static, or dead, weight from the chassis. The results will be improved acceleration and out-of-the-corner punch. If you race in the stock class, the lightweight MIP hardware will make a giant difference in your lap times.

The aluminum CVDs and Light Drives are available for all Team

Losi and Team Associated off-road vehicles. MIP plans to manufacture these products to fit the most popular R/C vehicles on the market. Call MIP or your hobby shop for prices and information.

The second tuning accessory is the 1-degree 'CR' rear hub carrier, part no. A9806; price—\$7.50. The Street Weapon uses the same rear hub carriers as the Double-X and Double-XT 'CR' off-road vehicles; this means that Street Weapon owners can take advantage of this new option. The rear hub carriers increase the toe-in at the rear wheels by a total of 2 degrees (1 degree per side). The added toe-in results in improved handling during acceleration, as well as improved straight-line stability. The 1-degree rear hub carriers are very useful when racing on slippery tracks. Adding more toe-in to the rear wheels will scrub off a little speed, but the added stability overshadows the slight top speed handicap.



Team Losi has also expanded its line of precision springs to include a full range of rates for touring cars. The new touring car springs are available in 1-pound increments, and seven rates are available; they range from the softest (7.6 White) to the firmest (14.6 Blue). Like all of Team Losi's springs, these 1.15-inch-long, precision-wound, heat-treated springs feature ends that have been ground flat and are color-coded with vibrant powder coating. Although the new springs are designed to fit the Street Weapon, they will also fit most of the other touring cars on the market. Part nos. are A-5117 to A5125; price—\$2.50.



Adding these new, optional parts to your toolbox will give you the tuning flexibility you need to race your Street Weapon touring car on a variety of track surfaces. Team Losi has many other cool new items in the works for the Street Weapon touring car, so stay tuned!

—G-Man



RACER news

The IEDA World Finals

The final '97 shot at 132 feet by Rick Eyrich

WHEN YOU HAVE the need for speed, electric drag racing fits the bill. Electric-class drag racers are a unique group of R/C competitors who are attracted to the straight-line feats of a side-by-side speed run. These speed freaks lay it all down on the starting line, anticipate the lights, hit the trigger and make it to the other end of the track in less than 2 seconds; all this, while trying to keep these 1/10 land rockets in a straight line, avoid retaining barriers and stop the car without sending it into a tumbling frenzy ... not as easy as it sounds!

The long, multi-race season of the International Electric Drag Racing Association (IEDA) wrapped up in south Florida at the '97 World Finals. Held at Showtime Dragway, the three-day event

featured excellent Miami weather, a smooth, high-traction track and, most important, plenty of enthusiastic drag racers.

QUALIFYING

Saturday's warm temperatures and the strip's grippy, consistent surface



The racers' reaction times off the sticky asphalt starting line could make or break the outcome of the run. Most times were in the low .500- to high .400-second range, with a .400 being a perfect light.



No matter how you positioned yourself on the starting line, the main idea was to be first at the other end of the drag strip. The World Finals saw plenty of straight-line action, plus the crowning of the '97 National champs in each class.



Concours judging was a real bear for race director Mike Blair. IEDA racers take a lot of pride in having ultra-sharp paintwork on their cars and trucks.

appeared potentially capable of creating some new IEDA national records. Leading the pack was California's Chris Collins, who made an incredible 1.686-second, 82.1mph pass with his Top Fuel dragster entry. There was also a 1.85-second Top Fuel funny car run by Grand Motorsports' Roy Anderson. Unfortunately, the car was wiped out in a finish-line crash two passes later!

Some other notable time slips showed that Texan A.D. Rigmaiden had both his



At first glance, you wouldn't believe these two racers spent the whole '97 season trying to beat each other! Close friends Jim MacQuarrie (left) and Glenn Carlson finished first and second in the

Super Gas national points chase.

Alcohol Rail and Funny cars running strong, with the 'flop' running near record speeds. Florida draggers Karen Harris, Jim MacQuarrie, Herb Pierson and Gilbert Pate also logged TQ runs in their respective divisions leading up to Sunday's elimination rounds.

The Class Finals

• **Bracket.** As was the case throughout the year, Karen Harris and Patty Pierson were the main story in brackets. Karen TQ'd the class on her way to the finals shootout with Patty, then captured the win and the series victory for the season. The consolation trophy went to first-time dragger Michele Prettyman and her Bolink Legends car.

• **Comp Eliminator.** IEDA president Corbitt Marshburn claimed TQ honors, but Jim MacQuarrie won the day. Jim's 2.834 pass overcame Scott Lemaster's 3.155 pass. Kate Kuznik recorded a 4.01 light on her way to the B-side win.

• **Super Gas.** This class was another year-long battle right to the finals. Jim MacQuarrie continued his Comp Eliminator-winning ways by taking both the TQ and the win, but his '97 class challenger, Glenn Carlson, made it a race! Jim ran a 2.307 to Glenn's 2.302, but MacQuarrie's better .421 reaction time overcame Glenn's faster run. Randy Harris would pick up the consolation award along with a fifth-place finish for the '97 points season.

• **Pro Truck.** '96 series winner and TQ'er Larry Westrem met the soon-to-be-crowned '97 champ, Mike Lemaster, in the class finale. Unfortunately, Westrem hit the outer lane pipe hard, knocking himself out of competition and giving Lemaster the win. Steve Powell took the consolation gold back to his Ft. Myers, FL, home.

• **Econo Rail.** Ben Laureano made the best of his long trip from Costa Mesa, CA, and pushed his 7-cell slingshot to a TQ/2.200 clocking, then drilled



Left: IEDA president and '97 Competition Eliminator class champ Corbitt Marshburn poses with his Bug Mobile. Marshburn also competes in NHRA full-size events, so he has quite an in-depth knowledge of drag racing. Right: Chris Collins, the World Finals Top Fuel champ and new national record holder, enjoys the moment.

John Yurgealitis on the tree for the winner's podium spot. Tim Blair pleased the hometown crowd with his consolation-run win.

• **Pro Stock.** Roy Anderson was the class of Pro Stock, literally. Since Roy was the only Pro Stocker signed up, most thought he'd "stroke it" down the strip. Wrong! Anderson proved his '97 championship was no fluke by running 1.9 seconds at 65mph with his Grand Motorsports doorslammer.

• **Alcohol Funny Car.** One might say "sibling rivalry" was the main point of the Florida race's alky flopper class. The brothers Pierson, Herb and Keith, met in the class final, and the outcome had Herb taking the win light. He also TQ'd the division with a 1.8-second, 68mph pass, which he duplicated in the final. The consolation position belonged to Curtis Jenkins.

• **Alcohol Rail.** Florida racer Gilbert Pate had a slight mathematical chance at the '97 class title, and he TQ'd the World Finals race trying to do it. However, A.D. Rigmaiden proved to be a tick faster than Pate in the winners' round and beat him with a 1.852 over a 1.875 race. Longtime IEDA competitor Lance Richards claimed the consolation win.

• **Pro Mod.** It takes a sharp driver to keep these hyper, 14-cell doorslammers "happy" down the 132-foot strip! Race director Mike Blair ripped off a 1.987/62mph TQ pass, but mechanical failure ruined his day after that. Gene Sarda and Steve Powell met in the final, with Sarda posting the win slip. Ken Kuznik's consolation victory gave him third place overall for the '97 Pro Mod points chase.

• **Top Fuel Funny Car.** This was the other single-sign-up class, but its competitor, Kent Vahlsing, is well known for winning drag races and setting records. Vahlsing recorded a 1.807 and a 1.960 with his passes, giving the assembled IEDA racers a great show in the process.

• **Top Fuel Dragster.** After his Friday 1.68/82mph pass, Chris Collins was looking for two things: a class win and a backup run that would be fast enough to claim the IEDA national record. Collins matched up with Alky Funny car runner-up Keith Pierson in the Top Fuel final, and Pierson gave him a real run for his money. Collins clicked off a 1.694 second time—fast enough for both the win and the record at 1.686 seconds/80.33mph. Lance Richards was again the consolation champ, backing up his twin award in the Alcohol Rail class.

THE BRACKET RACKET

Without a doubt, one of the best matchups for both the World Finals race and the entire IEDA season has been between Bracket division racers Karen Harris and Patty Pierson. These two met up in Bracket-class finals all season long, including at the World Finals in south Florida. Harris and Pierson had pulled far ahead of the rest in Bracket series points, so the winner had a chance for both the race and points titles.

Harris claimed the TQ honors with a 4.299 time; but in the final, Pierson actually posted a faster semi-round clocking of 3.60 seconds. This meant two things: Harris would have to run right on her dial time, and Pierson would have to back up her quicker pass to beat Harris. As it worked out, Harris was closer to her dial-in time than Patty was to hers, and this gave Harris the victory for the day and the title for the year.

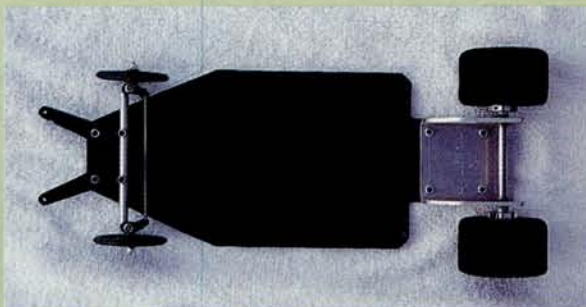


New Bracket national champ Karen Harris had a year-long duel with fellow Bracket racer Patty Pierson. Floridian Harris's consistent run-to-run times added up to the '97 title.

NEW IN THE PITS

Roy Anderson of Grand Motorsports—long known for its dirt oval cars and conversion kits—had a few drag-related products to show off in Florida. The company's Pro Stock kit includes a graphite chassis equipped with 14 battery slots, aluminum motor plates, clamp-style rear hubs, ball bearings, beam front axle and an adjustable traction system.

The other unique piece from Grand Motorsports was a roughed-out chassis that Anderson is developing as a spec-class drag car. Still in the prototype stage, this basic pan chassis design is being monitored by the IEDA as a stimulus for bringing new electric drag-racing drivers into the sport. The motor and battery specs are still top secret, but it's hoped that this new drag vehicle will catch on with a whole new straight-line crowd.



This prototype "spec car" chassis is the brainchild of Roy Anderson. The IEDA is keeping tabs on this new Grand Motorsports dragger that's designed to bring new blood into the organization.



Grand Motorsports' Pro Stock chassis features a 14-cell graphite plate to allow for any IEDA-class battery layout. Grand Motorsports is well known for its dirt oval cars and trucks, and the dragger has already proved its worth in the ranks of IEDA competitors.

FINAL THOUGHTS

Judging by the smiling faces seen when the World Finals were completed, this finale to the IEDA Championship season was a solid winner. Showtime Dragway would like to thank the IEDA, Northstar Dragway, Carolina Dragway, Curtis Jenkins Racing, Aquamyst Irrigation, Grand Motorsports and all the R/C drag

racers who made the trip to south Florida.

Congratulations to all the event winners/participants and the '97 national champs. After a long year of chasing points across the U.S., they deserve to be recognized as the best R/C drag racers around—bar none.

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Tamiya National Championships

by George M. Gonzalez

THE TAMIYA CHAMPIONSHIP Series (TCS) begins with regional racing events that are held at various times and locations throughout the country. Four racing classes are offered: 4WD, FWD, F1 and M-chassis plus concours judging. To keep the competition as fair as possible, only Tamiya vehicles and hop-ups are permitted, and factory-affiliated drivers or former TCS champions cannot compete for prizes.

The final leg of the TCS is the national championships at the Tamiya factory circuit in Aliso Viejo, CA. There, the winners in the four classes are eligible to compete with the top European and Japanese drivers at the Tamiya R/C World Championships in Japan. The best part, however, is that Tamiya picks up the tab, and the lucky (I mean talented) winners travel free! All the '97 TCS events were well attended, and the TCS National Championships brought it all together in colorful and exciting Tamiya fashion. Now, sit back and enjoy the event as we bring many of the highlights to you.



Right: the gang from S&N's Trackside Hobbies, Glendale, WI, (left to right)—Scott Mente, Erick Bruner, Scott Ernst (owner of Trackside Hobbies and past 4WD TCS national champion); Scott Bruner; Paul Lemieux; Michael Lack; Marty Hageman, and David Weir. These guys know how to have fun, and they're extremely competitive.



PHOTOS BY GEORGE M. GONZALEZ



Left: "Who's on 68?" A spacious drivers' stand shielded competitors from the SoCal sun.



After the event, the four new national champions competed in a 5-minute TL01 exhibition race. For those who haven't heard, the TL01 is Tamiya's latest 4WD touring car, and it offers good looks and great handling at an economical price.

The contestants were all given equally equipped (bone stock) TL01s and radio transmitters. The drivers started competitively but soon decided to just cruise for fun. Whenever one of the cars dropped

Four equally equipped Tamiya TL01 touring cars were raced by the TCS national champions in an exhibition race after the event. These cars drive well and look good.

TL01 Exhibition Race

The 1997 TCS national champions (left to right): Roy Alaan (M-chassis), Joe Houda (FWD), Mark Rebeck (F1), and Robert Itoh (4WD). All these talented drivers will race for the U.S. at the TCS World Championships in Japan.



Mini 4WD Mania

During the Nationals, Tamiya held a Mini 4WD exhibition race that attracted hundreds of spectators. Tamiya's Mini 4WDs are 1/24-scale electric vehicles powered by two AA batteries. The cars race on a portable track that can have as many as 10 racing lanes and can measure anywhere from 10 to 50 feet in length.



A view from one of the three Mini 4WD tracks. Many people participated in the Mini 4WD event. These children are the future of R/C.

Once the cars are turned on and placed on the track, you have no further control over them. The trick is to make your car go as fast as



The Mini 4WD con-course winners.

possible, without its flying off the track. These cars have tons of hop-up and tuning possibilities, and this keeps the racing experience interesting. Lap times are monitored electronically, so racing is fair, and the drivers could actually monitor performance gains achieved through various tuning techniques.

Mini 4WD racing is one of the most popular hobbies in Japan and is heavily publicized in TV shows, comic books and magazines. In fact,

Mini 4WD racing is far more popular than R/C in the Land of the Rising Sun! The exhibition race attracted many youngsters and their families and was a fun way to spend a sunny

afternoon. Tamiya offered many demonstrations and workshops that introduced people to this wonderful and exciting hobby. Most of the contestants walked away with cool prizes, too, and that alone would have been worth the price of admission—had they charged any!

Now boarding for Japan

TAMIYA NATIONAL CHAMPIONSHIPS

IT'S ALL IN THE NUMBERS

Rather than run the usual qualifiers and mains, the TCS holds six heats in which points are accumulated to determine the fastest heat time. A driver's slowest two heats are thrown out and used only in the event of a tie. The driver with the fastest time of the other four heats is declared the winner. This system ensures everyone has a chance at putting in a good race, and the championship isn't determined until the last heat has been run.

RACING ACTION

• **4WD.** The 4WD touring-car class was by far the fastest and the most popular. Racers were allowed to use any bushing-equipped

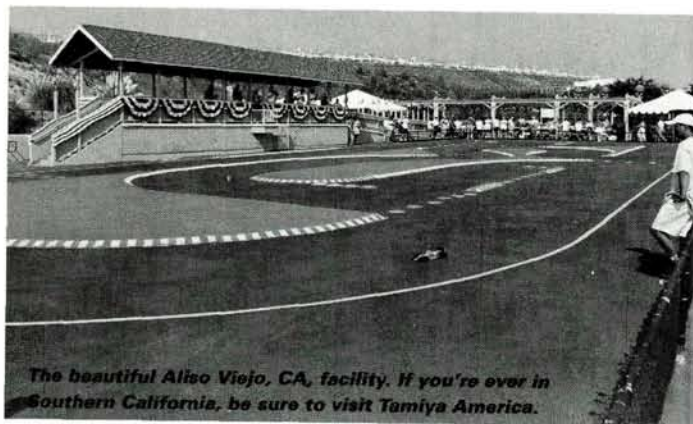


A view of the comfortable accommodations—a first-class pit area, indeed.

modified motor, but they had to run handout 1700mAh batteries.

As you might imagine, the racing was intense. The Tamiya TA03F-Pro was the machine of choice, but several TA02s competed and did very well. Robert Itoh ended up on top after six rounds of gruelling racing action and posted a 17/5:04 best time. Paul Lemieux (17/5:07) and Bob Sager (17/5:10) also raced competitively and finished second and third, respectively. Robert Itoh will race at the Tamiya R/C World Championships in Japan.

• **FWD.** The FWD class was also well attended; and because all the contestants ran handout closed-endbell motors, the racing was incredibly close. All the cars entered were TA02 FFs and the lap times were almost as fast as those in the 4WD cars. Joe



Houda and Mike Allen ran identical 16/5:06 best times, but Houda ended up on top once the score cards were tallied. Mike Allen had to settle for second, while Drew Hagestad, who turned in a 16/5:17 best time, rounded up third.

• **F1.** The F1 cars ran fast lap times and showed precision driving. It's quite a sight to see 10 F1 cars form a freight train through an intricate roadcourse. To my surprise, they were slightly slower than the 4WD cars. Mark Rebeck took the win only after doing battle with Steve Williams and Chien-Hwa Chen for six rounds of wheel-to-wheel action. Rebeck will defend the U.S. in this tough F1 class at the Tamiya R/C World Championships.

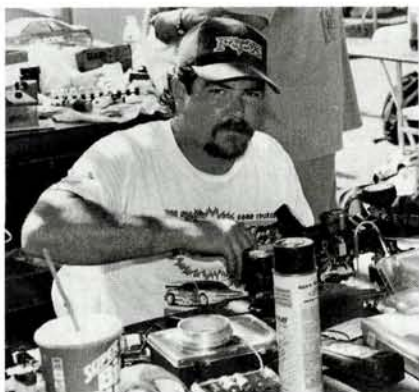
WE'VE PUT THE STAFF



When you're ready to fire up your on-road gas racer, fire up your computer first. Log onto the Team Serpent Network web site and check out our ever-expanding gas track directory, complete U.S. and world-wide racing calendars, track photos, contact numbers, maps and much more – total info for all the on-road nitro action in your area and beyond. Start your modem. Then, gentleman, start your engine.



• **M-chassis.** These cars are cute, but they are "a handful to drive," as one racer put it. Even with closed-endbell motors, these little cruisers can get up to some respectable speeds. Put them on a track with nine other minis, and you have the makings of a fun racing class. With Mini Coopers, VWs, Fiats and Miatas all racing



FWD concurs champion Bill Dunbar gets his car ready for one of the heats. He actually raced with his concurs-winning body.

together, it wasn't any wonder that this was one of the most popular classes. Roy Alaan's fast, consistent driving earned him the national championship and secured a

slot at the Tamiya R/C World Championships. Jesse Shapiro also raced extremely competitively and finished second, while John Houada rounded up third.

COLORFUL CONCOURS

Because Tamiya vehicles are highly detailed to start with, the judging criteria were very stringent and only the most highly detailed models had a chance at winning. Four concours classes were judged: F1, 4WD, FWD and M-chassis.

Fernando Salas from Garden Grove, CA, took the win in 4WD with his beautiful Nissan Skyline. His car features a completely detailed interior with roll bar and driver, working lights and flashers and much more. Bill Dunbar from San Diego, CA, stole the show in FWD with his Castrol Honda Accord. Bill's car has hand-painted graphics and a completely detailed interior. Marty Hageman from Mequon, WI, entered his F1 diorama and immediately had the judges' attention. Dan Munoz' VW Beetle (in Herbie, "the Love Bug" trim) and Louie Patterelli's Hot Wheels Eunos/Miata tied in the M-chassis judging.



John Brown from Staten Island, NY, works on his venerable Tamiya TA02. John says his TA02 is still a great performer and has no problem keeping up with the "fast guys."

FINAL THOUGHTS

The Tamiya TCS National Championships was an R/C spectacle. The racing action was intense, and the Mini 4WD exhibition race was a lot of fun to watch. Tamiya has a great series going, and we encourage all to participate. We congratulate all the newly crowned national champions and wish them much success at the Tamiya R/C World Championships. Hope to see you all there next year. ■

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HOME BUILT PROJECT

CHEVY CREWCAB

by Kevin Hetman

SOMETIMES, you just gotta believe. Although many of my R/C buddies were impressed by my previous scale projects, such as my Tamiya* King Hauler that was featured in the May 1997 issue of R/C Car Action, they were skeptical when I rattled off my wish list of features for the Chevy Crewcab I planned to build: pneumatic tilting bed, doors that open, scale body-on-frame chassis, full interior, hidden R/C gear Short of genetically engineering a little dude to drive it, I planned to build a totally scale machine. "That would be really cool—if you could pull it off," they commented. I took that as a challenge, and I set to work. After nine months of designing, building and tweaking, I had accomplished everything those nonbelievers thought I couldn't. See for yourself!

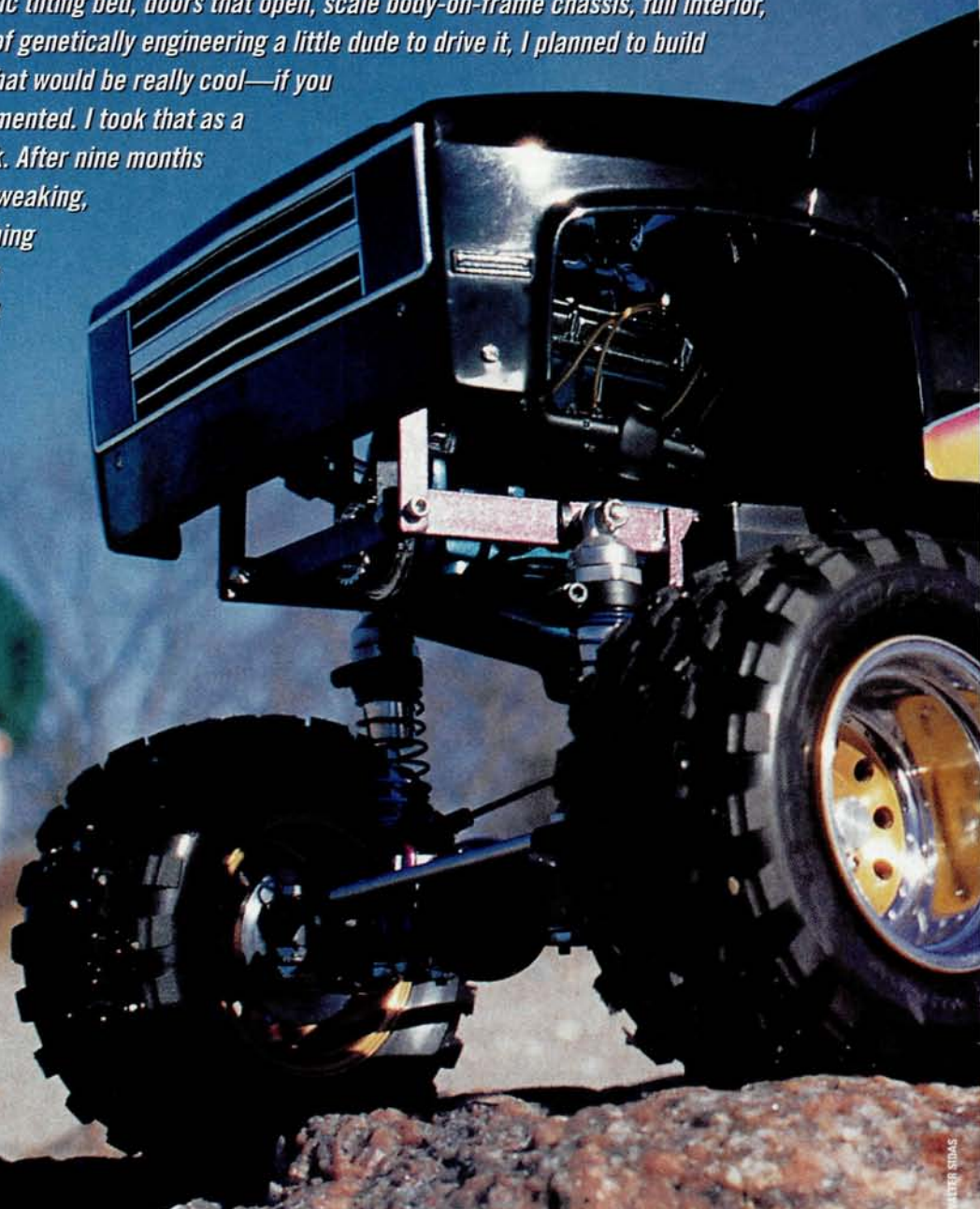
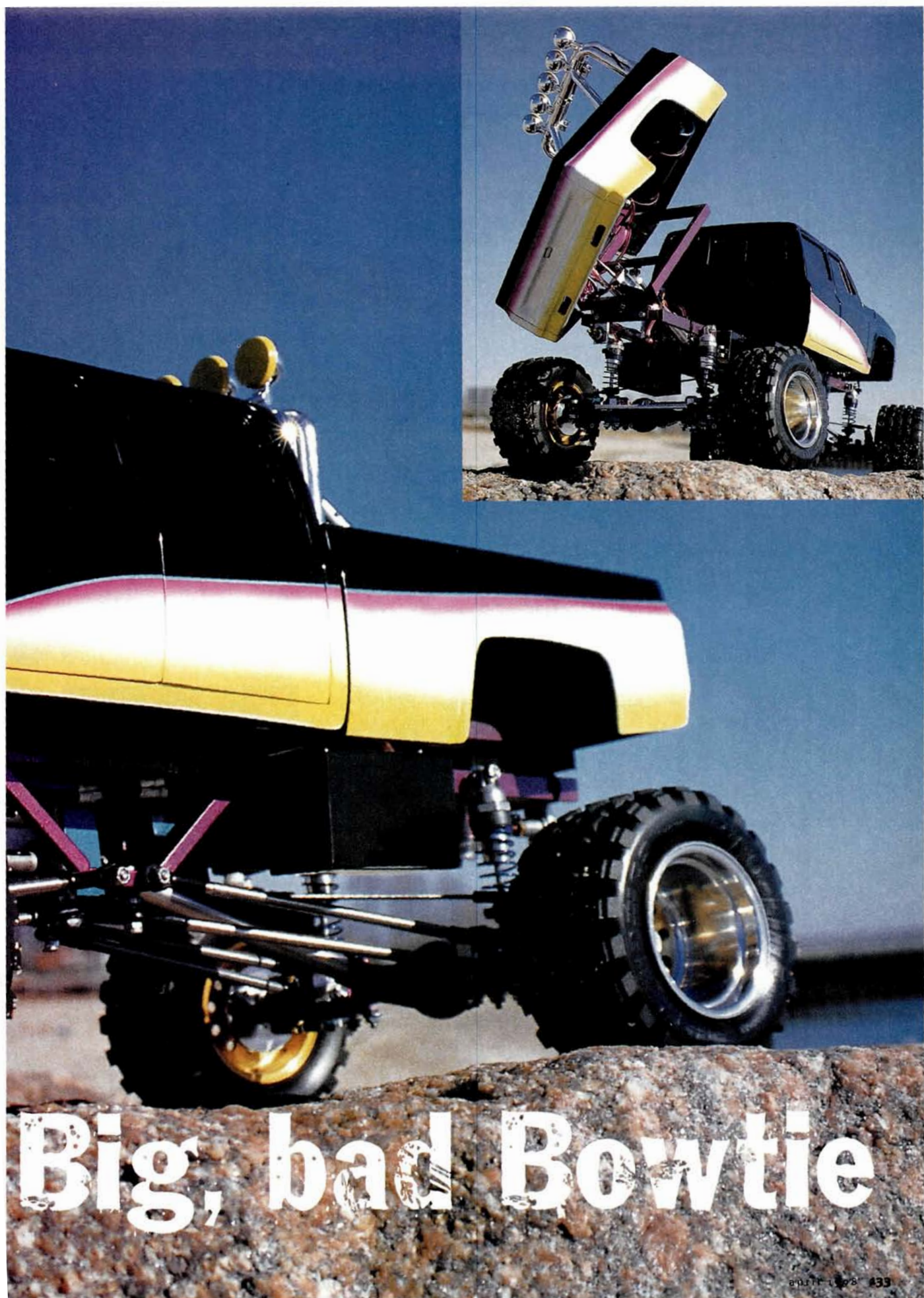
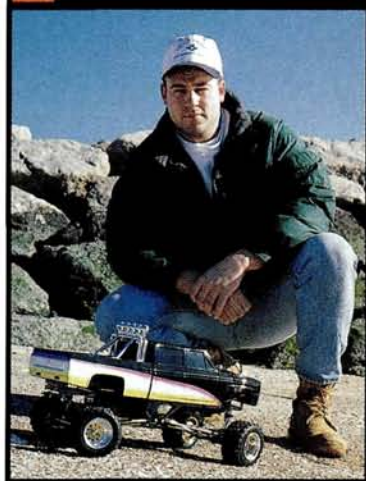


PHOTO: JIMMYE SIMAS

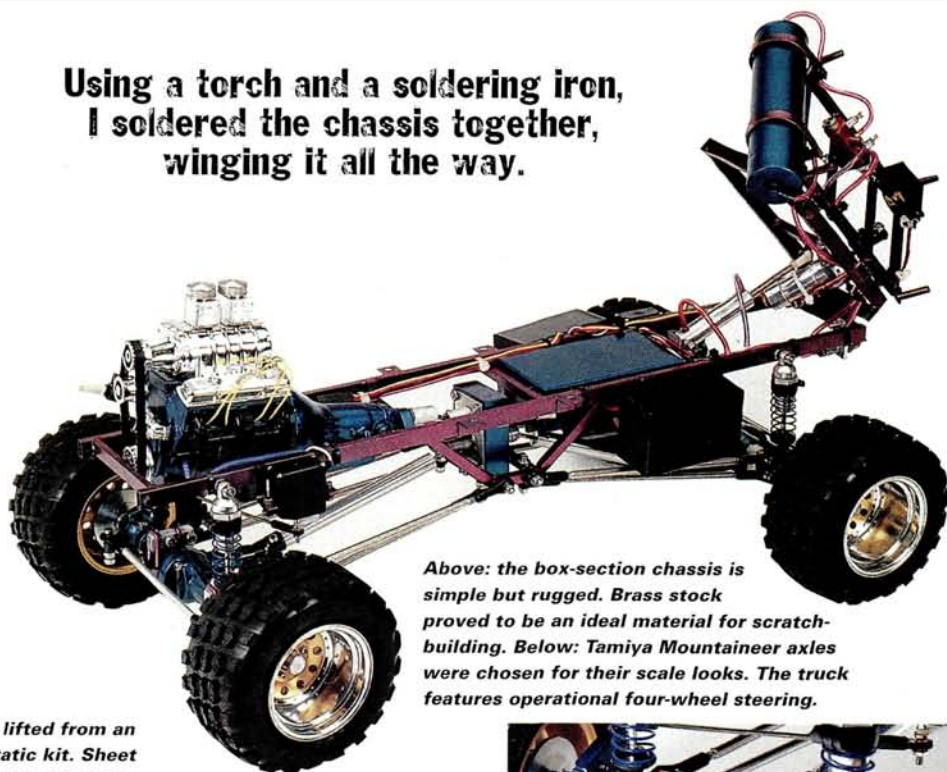


Big, bad Bowtie

HOME BUILT PROJECT



Using a torch and a soldering iron, I soldered the chassis together, winging it all the way.



Above: the box-section chassis is simple but rugged. Brass stock proved to be an ideal material for scratch-building. Below: Tamiya Mountaineer axles were chosen for their scale looks. The truck features operational four-wheel steering.

The dashboard was lifted from an 1/8-scale Corvette static kit. Sheet plastic was added to the seats to make them look solid, and gray velour flocking was used to simulate fabric.



The shorty shocks are stripped and polished Associated units. Note the machined aluminum "disk brake."

Parts by Parks supplied these trick air cleaners.



Most R/C cars don't "come to life" until you drive them. The Crewcab is more exciting when it's standing still!



CHASSIS

I originally planned to use a Tamiya Mountaineer chassis for this project, but as I began to lay out my design, it became clear that the Mountaineer was not a viable option. However, I was soon inspired by a full-size truck that I saw on the cover of a magazine. It had a very basic—but durable-looking—chassis design. I studied the pictures closely and headed to the hobby shop to pick up some brass stock. This was the perfect way to begin the project; the brass stock was readily available and easy to work with, and I wasn't limited by the need to retrofit an existing chassis. I could build in any features I wanted!

Using a torch and a soldering iron, I soldered the chassis together, winging it all the way. Since the chassis was symmetrical, all I had to do was complete one side; then I was able to use it as a template for the other side.

After the main chassis had been completed, I started to work on the hood tilt mechanism. For greater realism, I wanted the hood to tilt via a mini air piston instead of a servo. To help determine where the piston should be installed, I laid out the chassis and hood on a CAD (computer-aided design) system. This allowed me to experiment with the piston's position to see where it would work best, without a frustrating trial-and-error process.

I wanted something really radical for the bed tilt. I was flipping through an old issue of *R/C Car Action* and came across Steve Levine's beautiful Prima Donna Clod, which featured a bed that tilted not only to the back, but to the side as well. I thought this would be perfect for my truck. I constructed the

framework for the tilt using the same brass stock as I had used for the chassis. Once again, I used air pistons instead of servos to operate the mechanism and used the CAD system to find the ideal mounting position. When all the chassis components had been constructed, I lightly sandblasted the parts and painted them with a custom-mixed Du Pont automotive paint in a raspberry hue.

SUSPENSION

I chose a set of Mountaineer axles for the Crewcab, as they are the most realistic units I could find, short of scratch-building my own. I mounted steerable front axles on the rear of the truck to facilitate 4-wheel steering. To suspend the axles, I opted for a full, 4-link suspension with coil-over shocks. I have a Bennett Equipment* Clod-a-Leaver chassis, and I noticed that the wheelbase of that truck would be perfect for my application. I called Larry Bennett to order a set of suspension bars for my truck. To attach the links to the axles, I machined a set of aluminum blocks and screwed the bars to them with 4-40 screws. Then I attached the blocks to the axles using the original U-bolts from the Tamiya Bruiser. The blocks double as mounts for the shocks; I used short Associated* shocks because they were the perfect size. A quick sandblasting removed the shocks' gold anodizing; this allowed the bodies to be polished to a beautiful shine. After the suspension had been completed, the axles were covered with PPG teal blue paint.

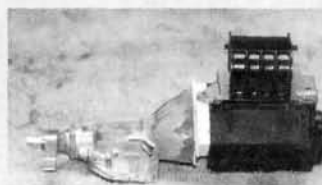
WHEELS AND TIRES

A custom truck must have trick wheels; my Crewcab project was no

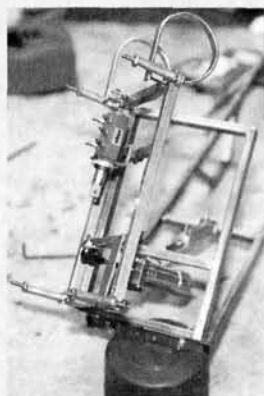


Above: almost done!

Actually, the primed Bondo look is pretty realistic, if you're going for that "I ran out of money" look. Right: an RS380 motor is nestled into the Parma dummy engine. This required a bit of grinding, but it's all worth it when curious onlookers try to find the drive motor.



The engine nears completion. Note the styrene stock I used to extend the dummy transmission.



Left: sure, I could have used servos and linkages to actuate the tilting bed, but that would have been too easy! Robart air cylinders do the job more realistically. Below: all the articulated components were well tested before final assembly. I don't mind building something complex, but I hate doing it twice!



Through the magic of Bondo, the exposed screws for the Sonic Tronics hinges will disappear. It took a lot of work to perfect the doors, but they really "sell" the truck.

SPECS

SCALE 1/10
TYPE 4WD/4WS custom truck

DIMENSIONS
Track (F/R) 10 in.
Wheelbase 14 in.

WEIGHT 7 lb.

DRIVE TRAIN Concealed RS380 motor with custom-built, reduced drive transfer case. Shaft-driven solid axles front and rear, with functional 4-wheel steering.

SUSPENSION (F/R) Coil-over, oil-filled aluminum shock absorbers.

Features: two-way pneumatic tilting bed, sliding rear window, doors and engine hood that can be opened, concealed motor, detailed engine, complete interior, custom-built brass chassis, aluminum wheels, scale disc brakes.

BUILDING NOTES

Construction time: about 300 hours.

Total cost: \$100 (I already had a lot of parts from previous projects). Between the cost of the parts and my time, it would probably cost about \$3,000 to build another.

Most difficult step: stretching the cab, and getting those doors to operate properly! The finished product looks factory, but there's a lot of Bondo and sanding under the paint.

Next project: I'm working on a completely scratch-built '30 Ford street rod. I'm welding a tube frame, and it will have a 5-link suspension with coil-over shocks, a full interior and—probably—working lights. I'm even sculpting the body for it myself!

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A&L Aero Tech Airtronics Associated Astro Flight Autographics BBR BME Bandits Barracuda Bel-Ray Bolinx BRP CRC (Calandra) C&M/Cobra Chicago Mod Comp. Elect. Comp. Craft Cooper Crowe Dahm's Dan's RC Dubro Edge Elite Speed ESP ETA Factory Works Fast Lane Gator	Hammad Ghuman Hammer (RC1) Holoshot Hot Bodies Hot Socks HPI Hyperdrive Irrgang (IRS) Kimbrough Lightning Rod Lightspeed Lunsford Lupo Matrix (Integy) MIP MPH NMB Novak Ofna Ozone Paragon Parma Pole Position Power Source Powertron Progressive Pro Line Pro Shot Protoform Puretech	Race Prep Racer Choice Racer's Edge Racetch Raceway mfg RCM RCPS Robinson RPM Saiko Sassy SMC Speedworks TA Emerald TD Ent. Tamiya Team Losi Tecnacraft Teddy's Tekin Traxxas TRC Trinity Ungar Victor Wilha Wood Wolfe W.S. Deans XIPP
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HOMEBUILT CHEVY CREWCAB

exception. I outfitted my rig with an old set of Sees aluminum wheels that were originally made for the Tamiya Blackfoot. A bit of machine work was required to get the rims to fit the Mountaineer axles, but I had to have 'em! I also installed Pro-Line's* Dirt Hawg tires. In addition to excellent all-terrain performance, these chunky treads have a great scale look.

DRIVE TRAIN

I didn't want a lot of R/C gear to be visible on the chassis, especially the incongruous sight of an electric motor where a big chunk of American iron should be. I concealed the Crewcab's electric powerplant inside a fully detailed Parma* dummy engine. I used a 380 motor, which fit perfectly inside the Parma engine. Sure, the little 380 is no fire breather, but I didn't build this truck to pound on! The tiny mill is plenty strong enough for "look-at-me" cruisin'. An 1/8-scale Monogram engine supplied the heads, valve covers, transmission, water pump and oil pan, while the dual carburetors are from a Kyosho* USA-1 truck. The blower, carbs, valve covers and various other items were made from plastic stock. I could have painted these parts silver to simulate chrome, but that just wouldn't have looked right. Instead, I shipped the parts off to Chrome Tech USA* for a dip in the shiny stuff. If you need to have plastic parts chromed, they're the guys to call!

It took some doing to get the 380 motor to function within the confines of the Parma engine. I machined an extension for the motor's shaft so it would reach the end of the transmission housing. From there, a dogbone runs from the end of the transmission to a custom-made transfer case that I made using the top shaft and differential from an Associated Stealth transmission. The gears are mounted on ball bearings between two aluminum plates, and a set of machined aluminum drive shafts transmits power to the axles.

BODY

Two Clod Buster bodies were used to make the cab; one body donated its hood, bed and the front half of the cab, while the other donated the rear half of its cab. After I had cut the sections that I needed to make the extended cab, I removed the doors from both bodies and glued the two cab halves together. When the main cab had been finished, I prepared the four doors to be hinged. The front doors went smoothly, but the rear doors were not so easy; I had to modify them to look like the rear doors on a real Crewcab. I didn't want to have a view-obstructing pillar in the center of the cab, so I hinged the rear doors to open suicide-style. Sonic

Tronics'* hidden hinges were perfect for this. To jazz up the hood, I added a cowl induction-type scoop from an old 1/12-scale Camaro kit I had kicking around. My buddy Joe Wade said it was cool, so on it went! I modified the bed, too, by gluing a sheet of styrene plastic onto it to cover the opening that remained after I separated it from the cab. To give the bed a smoother look, I used a Dremel tool to drill out the taillights, then made two cuts where the rear bumper was meant to go and made new taillights. Last, I made a bed cover of styrene plastic and painted it semigloss black. When everything fit snugly and looked right, it was time to paint.

I covered the body with three coats of Testors Colors by Boyds* high-gloss black. Each coat was allowed to dry for a week and then sanded with 6,000-grit sandpaper. After the truck had been well-covered with black, I masked it off and painted the graphics; then I covered the completed paint job with three coats of clear. I also sanded the first two coats of clear with 6,000-grit sandpaper, and the final coat with 6,000-, 8,000- and 12,000-grit sandpaper. After the final sanding, I waxed the body to bring out the shine.

INTERIOR

With the exterior finished, it was time to move inside. I covered the floors, back wall, firewall and roof with carpet-like fabric. The front seats are from a 1/12-scale model, and the back seat is from a Bruiser. The door panels have roll-down handles for the windows, arm rests and small pockets. The "glass" is thin, clear plastic, while the front window is a Clod Buster piece. To complete the cab, I made a sliding rear window using some C-channel polystyrene plastic and clear plastic. I painted the windows black for a "street" look.

ELECTRONICS

The guiding force for this truck is an Airtronics* Caliber 3PS. Two Hobbico* miniservos control the steering, while another miniservo works the air system. An unusually small ESC was needed to fit within the space I had allotted for electronics; to get my project rolling, I installed an old Victor Engineering* ESC.

A project like my Chevy Crewcab is never really finished; there's always something else to add! Even unfinished, it's definitely a difficult project to top, although I'll no doubt try.

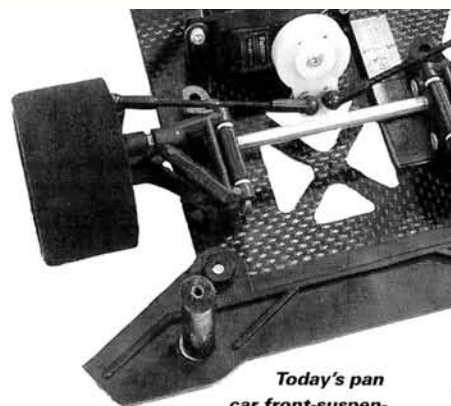
I would like to thank Jim Petzold at JP's Hobbies, Chris Kuskowski, Steve Levine, Rich Fehrs and Larry Bennett of Bennett Equipment. It would have been impossible to build this truck without their help.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.

HOW TO

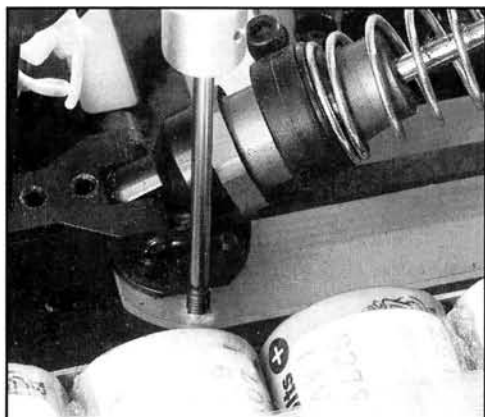
by Kevin Meyer

LTO Pan Car Tuning Basics



Today's pan car front-suspension systems allow a full range of adjustments. This Associated Dynamic Strut unit has adjustable caster, camber and toe. Also notable is the lead weight, which helps keep the inside tire on the ground during cornering. If your car is lighter than the minimum requirement for racing, you can add the weight back where it can benefit the car most.

IN ANY FORM of motor racing—but especially the oval scene—the uninitiated believe that speed equals victory. If you have the fastest car, you're bound to win the race—right? Not exactly. As any racer will tell you, the most important factor that can help you win is proper chassis setup. Real speed doesn't come from bolting in a low-wind mod and some crazy batteries; the cars that break track records are the ones that scrub the least speed in corners, get back on the gas more quickly and out-handle their competitors. Although some might have you believe otherwise, chassis setup is no black art; with a few simple concepts and a bit of patience, you can soon be knocking tenths off your best time.



The tweak screws change the angle of the T-plate and motor pod in relation to the chassis. If one tire comes up off the surface before the other, loosen the T-plate screw on the side that lifted $\frac{1}{8}$ turn and tighten the other $\frac{1}{8}$ turn, then repeat and recheck the rear tires until they rise at the same time.

SUSPENSION

With the introduction of today's highly tunable front-suspension designs, it is easier than ever to precisely dial in camber, caster and toe-in. In addition to the static settings, most modern cars also allow caster to be dynamic, changing with suspension travel to help the car turn into and exit corners with equal agility. The modern rear suspension has also evolved from the classic T-plate and mono-shock design. The popular triple-shock layout has been a successful design that lends itself to a multitude of adjustments by varying spring rates and shock-oil weights. Damper tubes and roll bars (swaybars) may also be used to obtain better handling.

SPRINGS

These are perhaps the most overlooked parts when it comes to dialing in the front suspension. Springs are easily the cheapest accessory available for suspension tuning. A general rule for spring application is: the softer the spring, the more "bite" or traction the tire will have. Having the correct front springs can prevent your car from oversteering (diving) or understeering (pushing). If you have a problem with understeer, try a softer left-side spring. If the condition persists, try a softer right spring. When your car oversteers, use a firmer right-side spring with a harder one on the left side. On the rear shock(s), softer springs will give more traction.

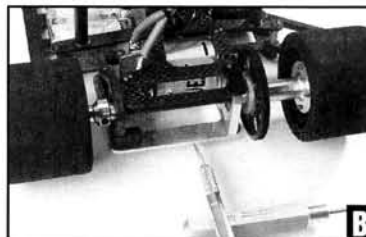
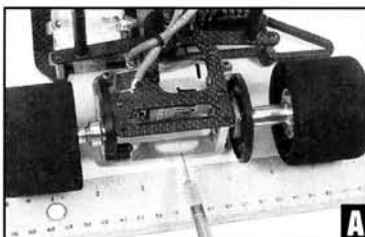


Spring rate changes are another way to improve steering. The newer front suspensions make spring changes easy.

TIRES

There have been monumental improvements in tires in just the past two years. A whole new generation of compounds has improved the performance of foam tires. When choosing a foam tire,

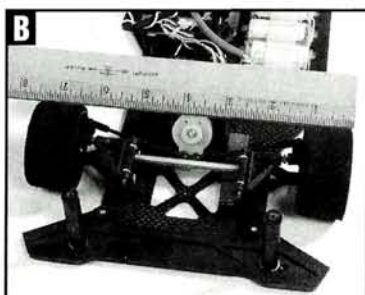
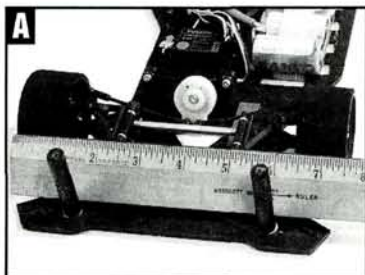
remember that the softer compounds give more traction but will also decrease the life of the tire. The trick is to have the tire combo that provides plenty of traction in the rear and enough steering



To determine your car's tweak status, find the center of the motor pod by first measuring the distance from the outside of the rear tires. When you find the center, mark the spot on the pod by using a piece of tape or scribing a line with a hobby knife (A). To check the chassis tweak, place the ready-to-run car on a flat surface, put the hobby knife blade on the center mark of the motor pod and lift up slowly, paying close attention to the tires. If they lift off the surface at the same time (B), the chassis has no tweak. This is a good starting point for chassis setup.

PHOTOS BY WALTER SIDAS

HOW TO: LTO PAN CAR BASICS



Here's an easy way to check toe-in that's more precise than the eyeball method: measure the edge-to-edge distance between the tires' outside front edges (A), then measure the edge-to-edge distance of the outside trailing edges (B). If the measurements are the same, you have zero toe-in.

UNDERSTANDING TRACK TALK

I've compiled some of the more common terms used to describe handling and adjustments (references to left and right are made as though you are standing behind the car or sitting in an imaginary driver's seat).

LTO (left turn only): generally used to describe the batteries-on-the-left configuration of an oval car.

Camber: refers to the angle of the front tires when viewed from the front of the car. When the top of the tire leans out, away from the center of the chassis, the wheel is said to have positive (+) camber. If the top of the tire leans in toward the center of the chassis, the wheel is exhibiting negative (-) camber.

Caster: refers to the angle of the front suspension's kingpins (the pivot pins for the front hubs). If the kingpin leans forward, it has negative (-) caster. If the kingpin leans backward, it has positive (+) caster. This adjustment affects the amount of steering the car has during cornering. Too much caster can make the car unstable in corners or twitchy in the straights.

Understeer or "push": if the front wheels do not have sufficient traction, they will slide along the track rather than steer the car. This is often called "push," as the rear wheels are pushing the fronts instead of being steered by them.

Oversteer or "dive": plenty of steering here, but the rear end wants to break loose or spin out. In this case, the front end has more traction than the rear.

If it doesn't loop out entirely, the car may "dive" to the inside of the track when entering corners.

Stagger: describes the difference between the circumferences of the inside and outside rear tires. To increase steering, the tires on the left side are smaller than on the right side. This size difference helps compensate for the shorter path around the track taken by the inside tires. Stagger is usually adjusted in $\frac{1}{16}$ - to $\frac{1}{8}$ -inch increments. This can be achieved with foam tires by using a tire-truer and an accurate means of measuring the tire circumference (an inexpensive set of calipers will be fine). Stagger is most advantageous on flat tracks and is generally not required on banked tracks. Capped tires can be purchased in staggered sets.

Toe-in: the angle of the front tires when viewed from above. If the tires point straight ahead, they have zero degrees of toe-in. If the front edges of the tires point in toward the center of the car, the wheels are toed-in. If the wheels point away from the center, they are toed-out.

Caps: short for capped tires. These are basically foam tires with a rubber skin molded over the foam. This type of tire is best when used on concrete surfaces.

Hex Appeal



Sure, their shapely contours and sizzling red anodized finishes are seductive.

"Hold me," they plead.

But the new Dynamite Hex Wrenches are more than just a set of pretty handles.

They're incredibly functional.

With hardened, replaceable, ground tool steel tips, they'll never "round off." And those alluring CNC-machined aluminum handles are shaped for a heavy-duty grip. Plus they're perfectly proportioned to their tips for size-relative torque.

To top it off, their sizes are clearly inscribed and there's a flat machined in each one so they'll stay put in your pit area.

And they're waiting patiently at your dealers' now.



Too cool—handles proportioned to the tips for perfect torque! Available in all popular metric and standard sizes.



Dynamite products are exclusively distributed by Hamilton & Bailey, Inc. 4105 Industrial Home, Newburgh, NY 12551 (517) 351-1611. www.hamiltonandbailey.com

up front to negotiate the corners. "Capped" tires, which feature a rubber skin over foam, are used exclusively on concrete and paved surfaces, most notably the banked velodrome tracks that require tires that can handle high speeds and extreme cornering forces.

To counter the effects of chassis roll, the front suspension has increased camber angle. As the car corners and the chassis tries to lift on the left side, the tires will lean toward the outside of the turn. By dialing in the camber as shown, the tires' contact patch increases as the tires lean toward vertical. A good starting point for camber setting is 1 to 2 degrees of positive camber on the left front and 2 degrees of negative camber on the right side.

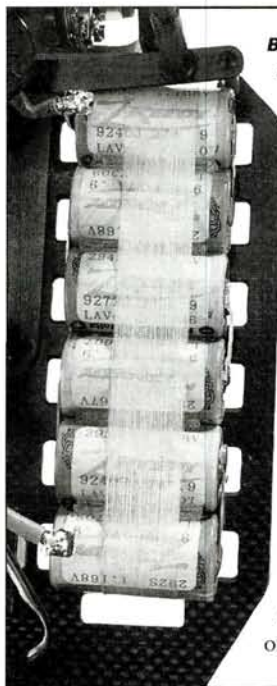


FINAL THOUGHTS

These are some basic tuning ideas. Personal driving style, track conditions and track surface all influence how you set

up your car. Once you have your chassis figured out, you'll be able to tell how different adjustments can affect your car's handling. Be methodical, and make only one adjustment at a time. Don't be afraid to experiment, and be sure to take notes. Documenting your setup changes makes it

Battery pack placement can play a big part in your pan-car's handling. It's not rocket science; moving the battery forward will increase front tire traction, and vice versa as the pack is moved aft. Racers may also move the pack toward the outside of the chassis for tracks with wide sweeping turns in an effort to counter the weight transfer during cornering, or they may move the pack inboard for tracks with sharp turns to help the car transition from turn to straights more quickly.



CHASSIS

There are hordes of chassis designs to pick from these days. Each chassis has its own personality and subtle characteristics, but weight distribution is critical. Approximately 50 to 60 percent of a vehicle's weight should be on the left side of the chassis. When mounting electronic components, try to locate them as close to the center of the chassis as possible. Oval cars are designed to have the battery packs mounted on the left side to counter weight transfer when cornering. Some manufacturers offer chassis layouts that feature additional battery slots and/or extra-wide slots, that allow the batteries to be moved fore and aft, or inboard and outboard, to tune handling.

easier to go back to a previous formula that works. My philosophy is: find a good setup that you're comfortable with and don't stray too far from it. Once you have a setup that works, you can concentrate on how *you* handle your car, instead of how your car handles! ■

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Track Side Quick Fixes

When time runs out by Rick Eyrich

ONCE NOTICED a small, homemade sign on a racer's toolbox; it read, "Nothing Ever Breaks When It's Convenient." Talk about hitting the nail on the head! That short statement really holds true with R/C cars. Let's face it, whether you're a beginner or a seasoned pro, your R/C vehicles are going to break down occasionally.

Although you can't predict when your car is going to break down, you can take a few precautionary steps to reduce the time it takes to fix it. And these techniques aren't just for racers; they're also useful for the folks who just enjoy blowing off steam with their R/C cars and trucks. So, let's check out several ways you can quickly repair, restore and renew your R/C chariot for either the track or your backyard.

THINK BACKWARDS

This quick fix will be interesting to those R/C'ers who have stripped the screw holes on pan car rear hubs or 4WD touring-car spur gear mounts. A stripped screw hole can mean disaster if you're pushed for time, but it can be quickly fixed if you work backwards.

A 4-40 screw can be threaded into the stripped hole from behind the hub. After

you've installed the wheel on the hub, thread a 4-40 locknut onto the screw to hold the wheel in place. The same could be done with a stripped spur gear mounting hole. As long as there isn't a clearance problem, you'll be able to thread a 4-40 screw (or a 2.5mm screw, if your car is metric) from behind the spur gear mount and hold the spur gear in place with a locknut.

REPLACE YOUR BEARINGS WITH BUSHINGS?

Since ball bearings are usually the first upgrade R/C racers add to their vehicles, this emergency quick-fix should interest most folks. A rough-turning or even locked ball bearing has fouled up many a day of racing. Rather than pack up and go home, why not replace the damaged bearing with the stock bushing that came with your car? In most cases, the car will work just fine. The addition of a single bushing to your ball bearing-equipped car will not increase friction enough to be noticeable, and it will save your day.

LEXAN SANDWICHES

A snapped shock tower, a sheared-off A-arm, or a broken fiberglass upper chassis plate will put a damper on your day's activities. Of course, ultimately, you'll have to replace the broken part, but there is a way to fix the problem temporarily so that you can continue to have fun the rest of the day.

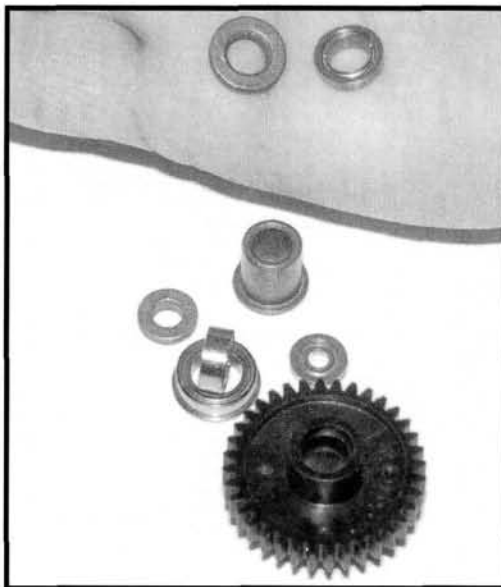
Here's what you'll need: scrap pieces of Lexan, a couple of twist-



PHOTOS BY RICK EYRICH



A stripped wheel hub can ruin your race day. In many cases, threading in a screw from behind the hub and securing the wheel with a locknut can save the hub.



Replacing a damaged bearing with a bushing may increase friction slightly but will save your bacon when the time comes.

ties, some CA glue and CA accelerator. The object is to sandwich the flat broken part between two Lexan strips; these should hold the pieces together long enough to run the Main.

SPARES TO SPARE

Many quick R/C car repairs can be accomplished with regular tools and materials, but there are times you might need a few special bits and pieces. Savvy R/C racers keep a fully packed box of spares with them whenever they go racing or are just out having fun.

A typical spares box will contain extra E-clips, old bushings, used shock O-rings, leftover kit parts, replaced bits from numerous performance upgrades and some old parts that you probably won't even recognize. Yet when something goes "snap" on your R/C car, having these tidbits can really make the difference between a great race day or one that comes to a sudden halt.

To store your widgets, pick up a snap-top, plastic parts bin box or other medium-size plastic container. Total organization isn't necessary; just be sure the parts are spread out enough to make them easy to pinpoint in a hurry. A box of miscellaneous stuff may not seem very important, but it can sometimes be the cure for a suffering R/C vehicle. It can also be helpful to your R/C buddies or any fellow racers who might require a "quick fix" via your spares box.



Here's how it's done: cut the Lexan strips to match the part's diameter and then sand the part to provide adhesion. Next, coat the Lexan strips with thin CA and clamp the parts together with the twist-ties. The last step is to spray the whole thing with the CA accelerator; your trusty vehicle will once again be ready to go.

WELDING LEXAN WITH CA

Have your race-day plans ever been foiled by a cracked Lexan body shell?

More than once, I'm sure. You can quickly and easily fix a cracked body shell with CA. Sounds good, but will CA

repair a four- to five-inch-long crack that starts at the wheel well and ends on the hood, in time to make the next heat? Yes! Simply apply a bead of thick CA over the crack and then spray on some CA kicker (accelerator); this will cure and harden the CA instantly.

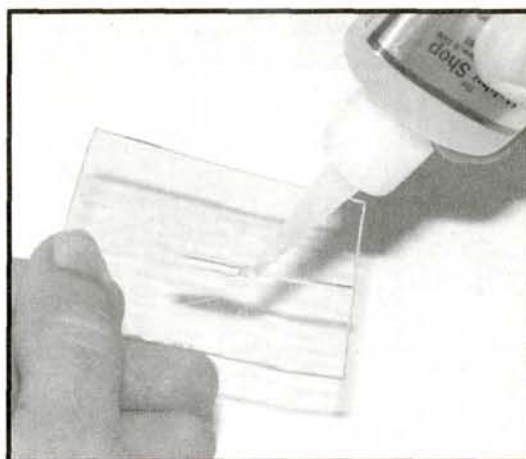
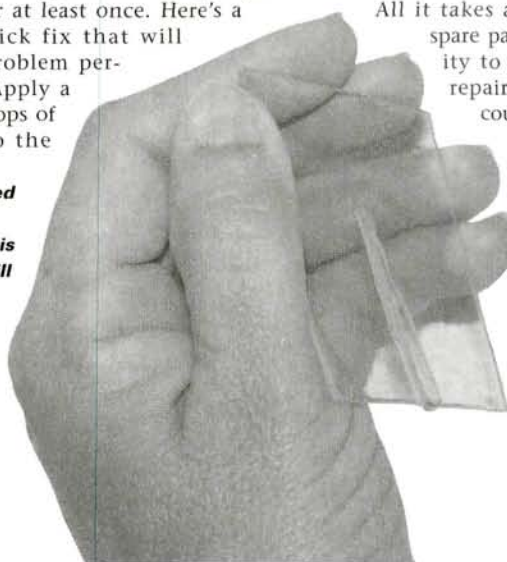
Here's how: first, clean the body inside and out with rubbing alcohol. Next, to prevent most of the thick CA from seeping through to the outer body shell, apply a strip of masking tape over the crack on the body's exterior. Last, apply a wide bead of adhesive down the crack and quickly spray the kicker onto the bonded areas. The finished product won't win any concours trophies, but it will allow you to finish up a day's worth of racing or backyard bashing.

A FIX FOR THE SELF-TAPPING SCREW BLUES

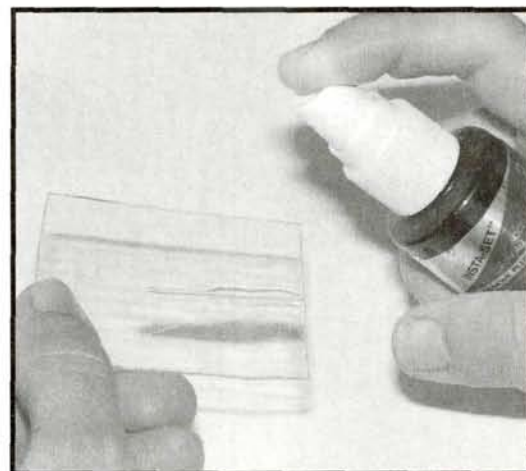
Speaking of stripped screws, how many times have you stripped a plastic mounting hole by overtightening a self-tapping screw? I'm sure this has happened to every beginner at least once. Here's a quick fix that will

solve the problem permanently. Apply a couple of drops of thick CA to the

The completed repair isn't pretty, but this type of fix will prevent cracks from propagating across the body—a much uglier fate.



This piece of scrap Lexan was split to simulate a crack in an R/C car's body shell. To repair this kind of damage, first lay a bead of thick CA over the split ...



... then spray CA kicker onto the joint. This will instantly harden the CA and get you back into action.

stripped screw hole and allow the glue to cure. Next, reinstall the screw, being certain not to overtighten it. Your part is as good as new.

FINAL THOUGHTS

All it takes are some tools, a few spare parts and a little ingenuity to make quick and easy repairs on R/C vehicles. Of course, most of the remedies described here won't pass the test of time, but they will let you finish that race or continue to terrorize your neighborhood. Next time your car breaks down, don't give up; just fix it. ■

Project Tamiya TA03

PART 3 FULL OPTION KAWADA

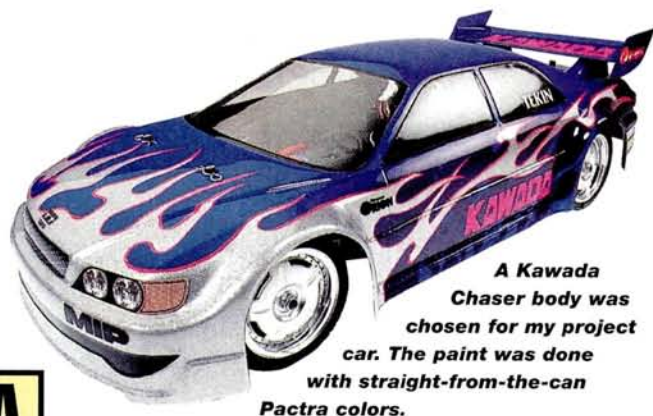
Minimum Mods Maximum Potential

by Greg Vogel

TAKING IT to the limits. That's what our Project Tamiya* TA03 series is all about. We showed you the G-Man's wild Kose* TA03 Mid and Peter Vieira's lightweight, ballistic Cross Racing* TA03F-Pro, and now it's up to me to put a spin on this series with my Kawada* TA03F super car.

To help me totally revamp this car's racing potential, Sunrise R/C* sent us all the Kawada hop-up options it imports. To make the final product even more astonishing on the track and in the pits, we also contacted other companies.

Moreover, instead of using a Pro chassis as a foundation, we started with a TA03F tub chassis in Mitsubishi Lancer Evolution IV racing trim. This will give TA03F tub-chassis owners an idea of which parts they will need to convert their road car into a full-blown racer.



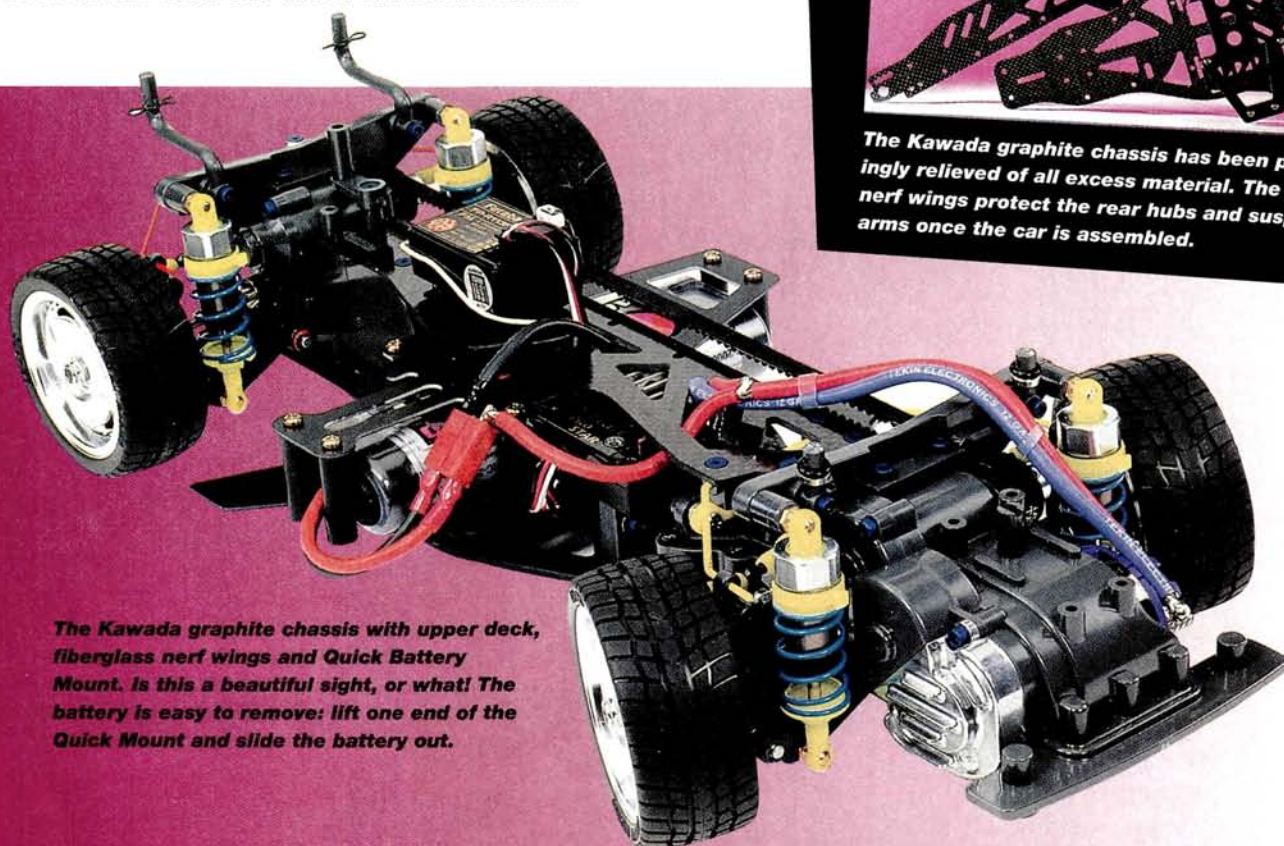
A Kawada Chaser body was chosen for my project car. The paint was done with straight-from-the-can Pactra colors.



A 13-turn MX-5 hand-wound Kawada motor. This little mill was perfect for hauling this decked-out TA03 around the track.



The Kawada graphite chassis has been painstakingly relieved of all excess material. The fiberglass nerf wings protect the rear hubs and suspension arms once the car is assembled.



The Kawada graphite chassis with upper deck, fiberglass nerf wings and Quick Battery Mount. Is this a beautiful sight, or what! The battery is easy to remove: lift one end of the Quick Mount and slide the battery out.

TAMIYA TRICKS

To control costs, the TA03F tub chassis comes with gear diffs and bushings. For this reason, I decided to install some of Tamiya's optional tuning parts.

- Sealed ball bearings—a complete set. This was my first mod. If you can afford ball bearings, install them when you build the car, and let your drive train run smoothly from the get-go.
- Super-smooth front and rear ball differentials—because I planned to do some hardcore racing.
- Lightweight aluminum countershafts. These replaced the 03's hefty steel countershafts and reduce rotating mass.
- Chassis/bellcrank block (part no. 50703). This is included with the TA03F-Pro, but I started with a TA03F tub chassis. This part is needed to support the bellcranks and the front gearbox.

KAWADA COLADA

Having put the stock plastic tub chassis aside, I started to prep Kawada's graphite chassis, which is cut from 100-percent woven graphite and looks incredibly trick.

The cool thing about this chassis is that it will take stick packs or saddle packs—your choice. If you choose stick packs, you'll need a TA03F-Pro battery holder or a Kawada Quick Battery Holder, which I chose. The Kawada mount allows you to use either stick or side-by-side racing packs, and it really frees battery installation of all hassle. There's no need for straps,



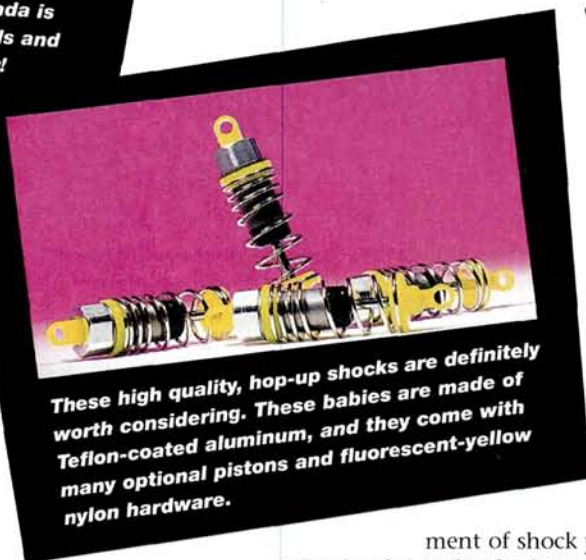
Here are some of the products Kawada is known best for—scale-looking wheels and tires. They look good and grip better!

tape, or body clips; just lift the narrow end of the fiberglass battery retainer and slide in the battery pack. The chassis also allows two stick-pack battery mounting locations: forward for more steering and rearward for more rear traction.

Next, I installed Kawada's stout upper chassis plate. It's made of the same woven graphite material as the chassis, and once installed, it stiffens the chassis so much that it would take superhuman strength to flex it.

I also decided to install a pair of Kawada nerf wings. They were designed to protect the rear suspension arms, wheels and shock tower, and they look cool.

If you plan to use the chassis battery slots for your saddle packs, you'll have to cut or grind off the mounting holes on the front and rear battery slots on the chassis (these holes are for



These high quality, hop-up shocks are definitely worth considering. These babies are made of Teflon-coated aluminum, and they come with many optional pistons and fluorescent-yellow nylon hardware.

OPTIONS USED

KAWADA

- Carbon main chassis—part no. TU-301
- Carbon upper chassis—TU-302
- Quick Battery Holder—TU-303
- Nerf wings—TU-310
- CP oil shocks—DN-150
- Color-coded swaybars—TU-311
- Steering tie-rod turnbuckle set—TU-307
- Upper arm with turnbuckle—TU-306
- VR-Dish Wheels (plated)—TU-76P
- Radial narrow mesh tire (orange)—TU-83M
- Rod adjusters—AJT-4815
- Toyota Chaser JTCC body—TU-65
- MX5 motor—M5R-130
- Dampers—DN150

BEAT X

- Superior Hex Hubs—B-01

TAMIYA

- Ball diffs—53267
- Ball-bearing set—53296
- Aluminum motor heat sink—532759
- Aluminum countershaft—53274
- Tuned-spring set—53163

TRINITY

- Metric to American hinge-pin kit—TA-113

MIP

- Shiny CVDs—1224

the stick-pack battery holder). You'll also have to secure your saddle pack on the chassis with strapping tape or some other fastening system.

I wanted my car to be as adjustable as I could make it, so I replaced its stock, non-adjustable camber links with Kawada's adjustable tie rod set. The set includes the tie rods, yellow nylon ball ends, aluminum ball joints and all the mounting hardware. I also replaced the stock threaded hinge pins with a Trinity* "metric to American" hinge-pin set. The kit includes all the necessary hinge pins and E-clips as well as a drill bit that's used to ream the hinge-pin mounting slots to the proper size.

Tamiya's stock plastic shocks are excellent, but I decided to go all out and install a complete set of Kawada's Teflon-coated CP oil shocks because they're as smooth as silk. They come with an assort-

ment of shock pistons and all sorts of bright yellow nylon hardware that looks snazzy on the TA03 chassis.

I built the shocks according to the instructions. I selected the no. 5, two-hole pistons from the black parts tree and put the original Tamiya limiters on the shaft to limit the down-travel. As David Jun recommended in "How to Build a Nats-Winning

TA03" (*R/C Car Action*, January '98), I filled the shocks with 30WT Associated shock oil. I installed Kawada's rod adjuster ball ends on the shock shaft; these extended ball ends allow the shocks to be mounted on the TA03's Delta-box suspension arms without the shocks' spring perches hitting the arms. I used Tamiya blue springs, which required a little manipulation to fit over the shock collars and spring perches. To help improve the car's handling, I added Kawada's color-coded sway-bars—yellow (soft) in the front and red (medium) in the rear.

Unlike George's and Pete's machines, mine doesn't have a bunch of aluminum suspension arms, uprights, or steering knuckles. Don't get me wrong; there's nothing wrong with aluminum suspension pieces, but the stock plastic units work extremely well and have proven to be durable. The stock dogbones, on the other hand, are ... well, stock. I decided to install MIP's* Shiny CVDs on all four corners. These axles reduce friction in the drive train and transfer power smoothly to the wheels despite the constantly changing pivot angles and the high loads imposed by a racing car.

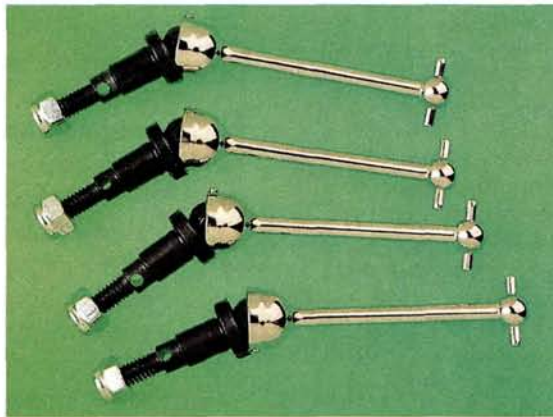
I also installed a pair of lightweight, Beat X* superior hex hubs. Each comes with an O-ring to hold the drive pin when the wheel is removed. They also come with a variety of shims that are useful for removing play between the drive pin and the wheel bearing.

In addition to installing adjustable upper camber links, I also installed Kawada's turnbuckle steering-arm set. The steering turnbuckles can be adjusted while still installed in the car—a major benefit when you need to make quick, trackside, front toe adjustments.

FINISHING ESSENTIALS

For serious power, I bolted a Kawada MX-5 13-turn motor behind the Tamiya aluminum heat sink. This hand-wound modified motor should really light up the tires. And speaking of tires: I decided on a set of Kawada belted tires and unique-looking VR-Dish wheels. The tires come with foam inserts and are composed of a soft rubber compound. Try this: cut the edges off the foam inserts before you glue the tires to the rims.

At last, it was time to choose a body. After scrutinizing Kawada's huge selection of unique offerings, I selected the Toyota Chaser (TU-65). This is one prime piece of Lexan! After painting it, I custom-made Kawada decals with a Sky Aviation*/Roland Stika vinyl cutter—a handy little machine that makes excellent decals.



MIP's Shiny CVDs are hidden once installed. Here, you can see the axles better.



More unseen parts of major importance: Tamiya's smooth ball diffs. Tamiya includes a full set of transmission gears with each diff.



Tamiya's lightweight aluminum countershafts, sealed ball bearings and aluminum motor heat sink were also installed.

After spending many days and nights tricking out this stunning vehicle, I certainly wasn't about to skimp on the electronics I'd use to control it. I chose Futaba's* 3PJ radio, FP-R113F FM receiver and new S3401 servo. A Tekin* P12C speedo regulates the power that comes from the Orion* 2000mAh battery pack.

PERFORMANCE

With a large empty parking lot at my disposal, I put the Kawada TA03 on the pavement for some serious ground-pounding action.

After watching Pete and the "G-Man" lay down the power with their cars, I knew I was in for a real treat. The car accelerated quickly and smoothly and headed for the turn at high speed. I had never run a Kawada motor before, but now I think I might find myself running one more often. This motor gave some massive yank on the straight and snapped out of each corner.

The smooth shocks and swaybar kit allowed me to hug the turns with minimal chassis roll; there was no sign of this car getting out of shape. I was also impressed by the abundance of steering with the front-mounted motor.

Kawada is known for its excellent tire compounds, and after running with them, I can understand why! The soft, yet non-sticky, belted radial tread tires were the hot ticket for the asphalt I ran on. I was glad I had taken the extra time to prep the tires before gluing, as the sidewalls got a real workout, and a loose bead can spell spinout in a turn. I believe the agility of Project 3 on a racecourse would make this car an explosive competitor.

PROJECT TA03 WRAP-UP

The Kawada TA03 featured on these pages may not look as exotic as George's Kose (Part 1) and Peter's Cross (Part 2) "Project" cars because the two have more aluminum hop-up parts than you can count! Just remember that more isn't necessarily

better; my Kawada car performs just as well as the other cars despite its slightly lower glam factor.

We hope that you enjoyed our three-part "Project TA03" series. Building, tuning and racing these cars was tons of fun and very enlightening. The companies featured all offer an excellent selection of parts that allow you to hop up your TA03 as much or as little as you want. Keep reading; we have many other cool projects to reveal. Until next time

*Addresses are listed alphabetically in the *Index of Manufacturers* on page 201. ■

The Z10 Pro seemed to float across the parking lot and absorbed every little bump without getting out of shape. The rear end wanted to give way in the turns, so I did some quick bench work and changed the rear oil viscosity from 30WT to 35WT. The small jump made all the difference in the world to reducing chassis roll. The car hugged the corner dots, showed no signs of push and was able to cut from corner to corner with quick, easy precision. The O-ring battery hold-downs did a good job of keeping the batteries in place, yet allowed me to remove and install each pack with ease. I checked the tension of the drive belts between runs and found that they had stretched them-

selves to nearly perfect tension. Since my initial tests, the belts haven't stretched any further.

FINAL THOUGHTS

OFNA has really stirred up the racing scene with the new Z10 Pro. It has the right stuff where it really counts; it's competitively priced, packed full of features and just plain works. Want proof? The car already has several major wins under its drive belt. When I hit the outdoor asphalt tracks, the Z10 Pro will be a powerful ally in the battle for a podium spot.

*Addresses are listed alphabetically in the Index of Manufacturers on page 201.

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6RC-1700	7.2V/1700	135 x 46 x 23	31.00
7RC-1700	8.4V/1700	150 x 46 x 23	36.00
6N-1700SCRC	7.2V/1700	135 x 46 x 23	34.00
7N-1700SCRC	8.4V/1700	150 x 46 x 23	39.50
6RC-20000	7.2V/2000	135 x 46 x 23	45.99
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4KR-600AE	4.8V/600	67 x 28 x 17	12.00
5N-600AA	6.0V/600	70 x 50 x 14	11.00
5KR-600AE	6.0V/600	83 x 28 x 17	12.00
8N-600AA-1	9.6V/600	100 x 29 x 29 (w/wire)	18.00
8N-600AA-3	10.2V/600	116 x 50 x 14 (w/wire)	18.00

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94737	Contest Hi-speed coreless BB (57oz/.15sec)	54.99
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HS-605BB	Ultra Torque Servo (77oz)	36.95
HS-605MG	Ultra Torq. Servo (all metal gear)	46.55
HS-615MG	Super Torq. (metal gear - 107oz)	46.55
HS-700BB	Giant Scale Servo (133oz)	29.55
Shredder Rx	Micro Shredder Receiver (all brands - 75mHz)	31.95
RXT0475	75mHz AM single conv. Tx & Rx set	8.50
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(Continued from page 52)

I know many racers run fuels with less oil than their engine manufacturers recommend, but keep in mind that this practice originated in on-road racing, where air cooling is optimum and rolling resistance is minimal—conditions under which improved cooling takes place. It's a different story when running at lower speeds on surfaces with high rolling resistance, such as soft dirt or sand. If you want to cut back a bit on oil content, I say buy a fuel that tells you just how much you're cutting back. Fuel makers need to understand we aren't idiots; give us the facts, dammit!

Even if you aren't "pistons possessed" as I am but you still love nitro cars, proper engine care is every bit as important to you as it is to me. An engine can quit or run erratically for many reasons, but this much is certain: there's no long-term dependability without proper care, and that starts with good fuel containing the recommended oil percentage.

I really want to hear from you guys and girls. Email me: chris@airage.com. Tell me how it's going—or not going!

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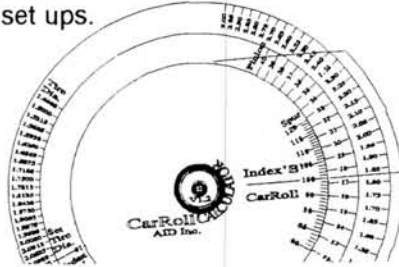
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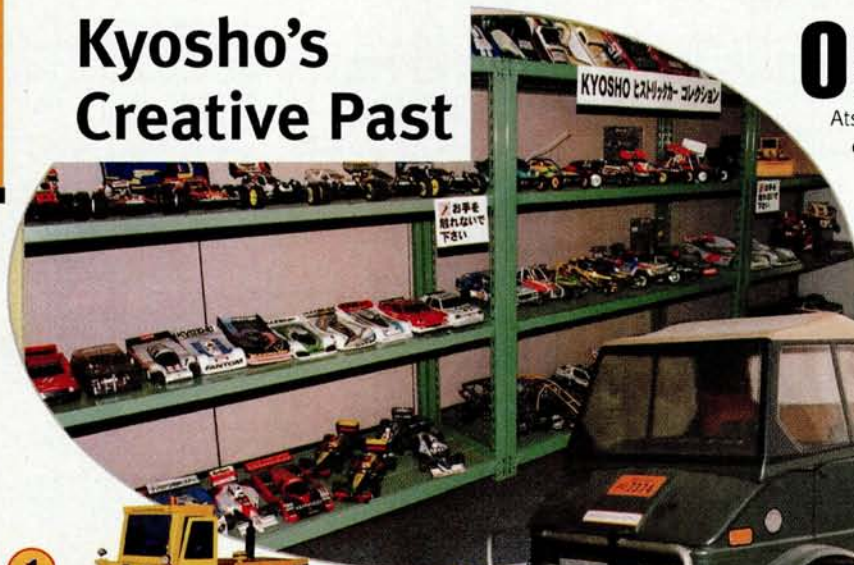
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Kyosho's Creative Past

On a recent trip to Tokyo, Japan, for the Kyosho World Cup (more about that in upcoming issues—much more!), I had the opportunity to visit Kyosho's main office in Atsugi, just outside Tokyo. One of my favorite rooms in this eight-story building is what I call "the history room." I've always felt that Kyosho is a company with vision—unafraid to explore new and creative ideas. The few examples shown here (there were many, but editorial space has its limits) are proof that progressive thinking is nothing new at Kyosho; it's their tradition. I hope you enjoy my selections. Some of these worked; some didn't. The point is, for a company to progress, waters must be tested ... chances taken.



3. 1980—
1/12-scale twin-
motor (Mabuchi 380s)
4WD Sonic Sports
on-road experiment.



5. 1985—1/32-scale
all-metal Hanomag-
66C Turbo Shovel
car. Note center
articulation and radio
compartment/cab.



2. 1985—1/8-scale Dirt
Road-10 Series 4WD
military-style truck.



5. 1987—1/8-scale 4WD
electric Lamborghini Diablo.
6. 1980—1/8-scale Uni-Pex-
TPT—three-piece type,
whatever that means.
Note the huge, cast-metal
differential case and aircraft-
style starter-cone system
coming off the rear. The
system worked well but
was, to say the least, heavy
by today's standards.
7. The 1/8-scale Circuit-20
Rowdy Baja. Note the cast-
metal trailing-arm suspension
all around; double arm
in front, single in the rear.



**Mikio Shimizu
is just one of
the many
creative
forces at
Kyosho.**



He's shown here with his full-scale and 1/10-scale creations—a highly modified Toyota Crusher (an extremely rare beast on the roads of Japan) and his twin-engine Baja Beetle. No! You can't get this as a kit, so don't even ask. What's in the future? Your guess is as good as mine.